# SOVIET ARMOURED CARS 1936–45

**JAMIE PRENATT**

ILLUSTRATED BY ADAM HOOK

NEW VANGUARD 284

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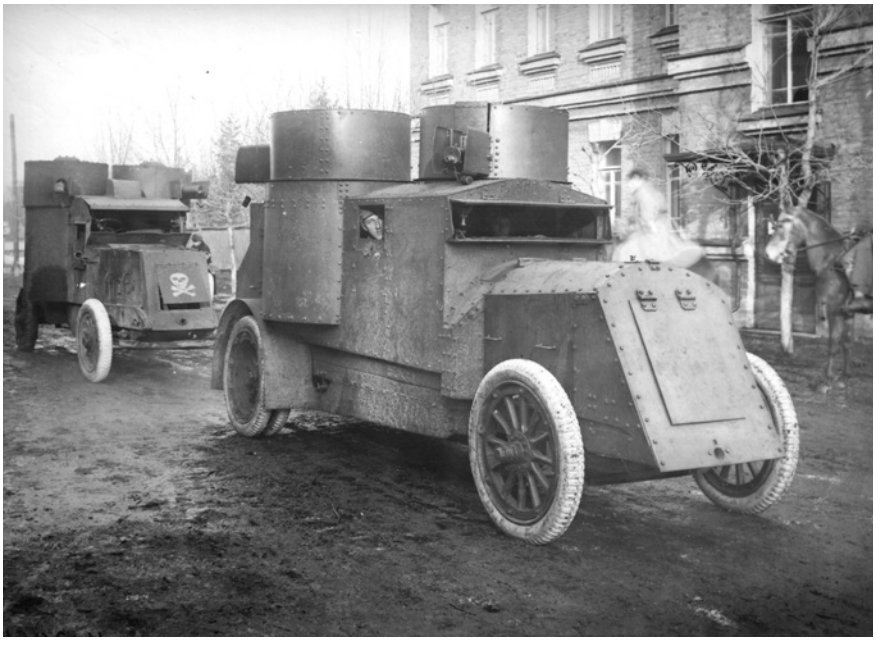
# SOVIET ARMOURED CARS 1936–45

## EARLY DEVELOPMENTS

As with the great powers of Western Europe and despite the lack of any meaningful industrial base, Russia possessed a visionary who was quick to recognize the military potential of armed, and later armoured, automobiles. In November 1899, an engineer named Dvinitsky proposed mounting a small calibre quick-firing gun on an automobile, but his idea was rejected by the Imperial Russian Artillery Committee. Undaunted, in 1900 Dvinitsky forwarded another design for consideration, this one for a steam-powered armoured car. This vehicle received some interest by the Committee, but the prototype constructed under their supervision was underpowered and dropped from further consideration. Although automobiles were tested successfully during Army manoeuvres as early as 1897, in 1900 there was no policy support for their use and the timing for their adoption was not considered favourable.

The outbreak of the Russo-Japanese War prompted renewed interest in the fielding of armoured cars, and a serving officer, M. A. Nakashidze, submitted a design to the War Ministry. It had a turret-mounted machine gun, good ground clearance, armoured discs protecting the wheels, armour of 4.5mm and a top speed of 50km/h. Due to the lack of a Russian firm capable of producing the vehicle, the War Ministry contracted with Charron Girardot et Voit, a French automobile manufacturer with experience in building an armoured car, to build a prototype, and following testing, a further ten were ordered. The absence of a mature automobile manufacturing industry hindered Russian armoured car development. The first domestic firm, the Russo-Balt Wagon Factory, wasn't established until 1908 and was limited largely to assembling vehicles from foreign components. The Russians ordered a number of armoured cars from abroad in 1913 as well as 15 light armoured cars and three gun-armed trucks from the Russo-Balt plant.

Meanwhile, the Russian General Staff established the Commission for Automotive Experimentation to evaluate the military value of armoured cars. The Commission evaluated a number of designs and conducted mobility and firing trials, which culminated in testing during field manoeuvres in 1906. The testing revealed that armoured cars were of great value for reconnaissance, liaison, use against cavalry and in pursuit. In 1913 a report on the use of armoured cars was delivered to the War Ministry, one of the earliest Russian tactical studies on the use of armour.



The Austin was Imperial Russia's most numerous armoured car. This two-wheel drive vehicle was armed with two Vickers-Maxim 7.62mm machine guns in separate turrets. It appeared in several series. The original series had side-by-side turrets. The second series had a slightly lower driver's compartment roof that widened the machine gun's field of fire, thicker armour and an additional, rearward-facing driver's position. The final series was similar to the second, but had a slightly modified hull, shields to protect the machine guns and other small changes. This version was also produced locally by Putilov, but introduced diagonally arranged turrets that further improved the machine guns' field of fire. Here, the foreground Austin is a series 1 followed by a series 2. They have just participated in the suppression of the Kronstadt Uprising by the Red Army in March 1921. (Nik Cornish at www.Stavka.org.uk)

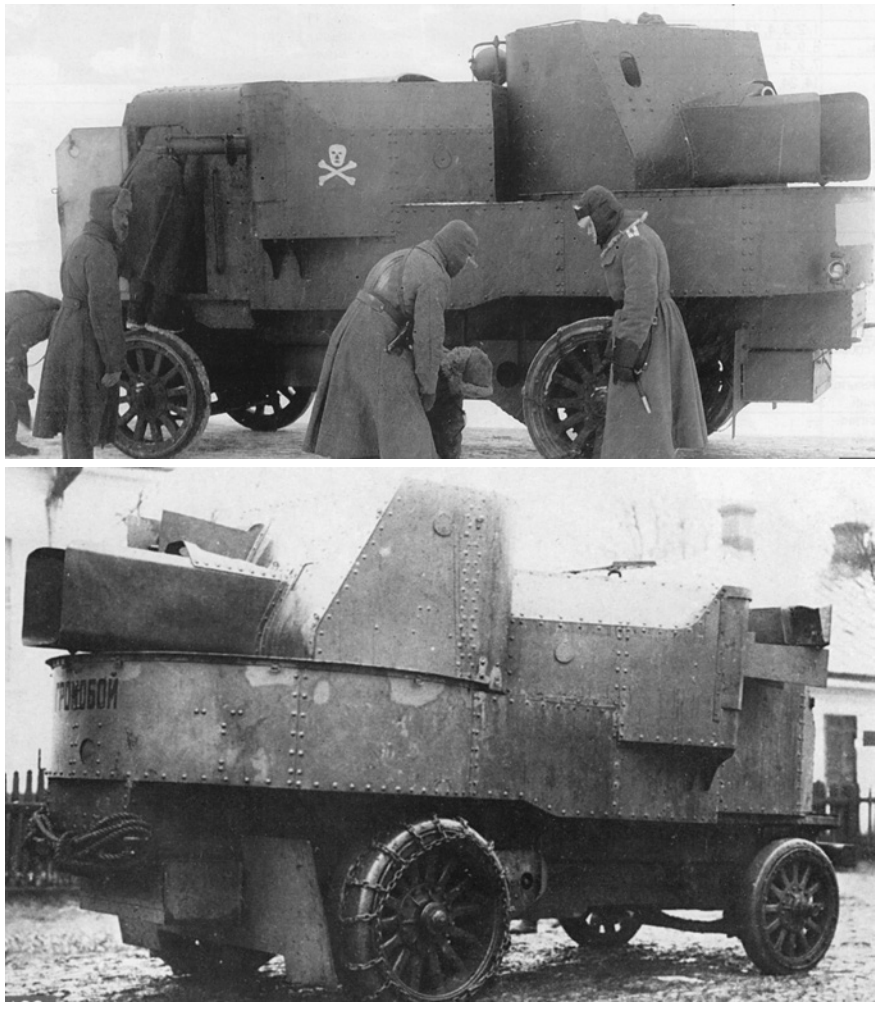
In 1914 the Army established the Automobile Corps and the first armoured car company, equipped with Russo-Balt armoured cars, went into action in mid-October. They were very successful and additional units were formed as more vehicles became available from domestic and foreign sources.

The Russians sourced foreign vehicles from a wide range of manufacturers, including Sheffield Simplex, Armstrong-Whitworth, Isotta-Fraschini, Austin, Lanchester, Peerless, Fiat, Renault, Pierce-Arrow and Packard. In addition to the Russo-Balt Factory, there were three other plants associated with domestic armoured car production: Putilov, Izhora and Obukhov. The Putilov and Izhora works in particular made extensive use of foreign chassis for the vehicles they produced. The Izhora works would later play a major role in the design and production of Soviet armoured cars.

Russia used more than 300 armoured cars of over 30 different models in World War I. The variety of types, combined with a chronic shortage of spare parts, must have created a logistical nightmare. In addition, all had high ground pressure and were essentially limited to use on roads that were in good condition. The Russo-Balt factory produced a halftrack vehicle based on the design of the French engineer Adolphe Kegresse as early as 1913, and the Russians produced a limited number of half-tracked armoured cars during the war.

An armoured car detachment in Petrograd was one of the first units to defect to the Bolsheviks during the Russian Revolution, and armoured cars played important roles on both sides in the civil war that followed as well as in the Russo-Polish War of 1920–21.

The post-Russian Civil War period was a lean one for armoured cars. Those acquired or indigenously produced during World War I were badly worn from use and spare parts were difficult to obtain. In addition, during this time the number of armoured car units was reduced. The only automobile factory in operation was the Moscow Automobile Plant (AMO – Avtomobilnoe Moskovskoe Obshchestvo). Established to produce the Italian



Two views, not the same vehicle, of a Garford-Putilov heavy armoured car. The rear outside tyres are fitted with chains for snow/icy terrain. Manufactured at the Putilov works on the US Garfield truck chassis, it boasted heavy armament – a 76.2mm cannon and one 7.62mm machine gun in a turret at the rear of the vehicle, plus two additional 7.62mm machine guns mounted in side sponsons. Top heavy and slow, it could also be adapted to run on railway tracks. It typically operated as part of a detachment that included two Austins. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

Fiat F-15 truck under license, it would supply the chassis for the BA-27, the only armoured car to be produced in the 1920s.

## STALIN AND THE FIRST FIVE-YEAR PLAN

As Joseph Stalin rose to power, he brought with him a belief that the development of heavy industry was key to Russia's modernization and successful competition with the West.

In 1929 several developments took place relevant to the technical and tactical reconstruction of the army – one was the establishment of the Department of Mechanization and Motorization of the Workers and Peasants Red Army (UMM RKKA). The Department consolidated the responsibilities of a number of separate military automotive and armour-related organizations. Among its functions was determining the type of vehicles needed and forming mechanized forces. That year the Red Army's first completely mechanized brigade was formed, containing both armoured and motorized elements, including 17 armoured cars.

Perhaps the most significant development for armoured car production, however, was the Soviet Union's signing of a contract with the Ford Motor Company. The most important provisions of the deal were for technology transfer and the design and construction of a manufacturing facility for the Model A sedan and Model AA truck. Based on the company's US plants, the facility – the Nizhny Novgorod Automobile Plant (NAZ – Nizhnenovgorodskiy Avtomobilniy Zavod) – began operation in 1932. Subsequently the city was renamed Gorky and the facility accordingly became the Gorky Automobile Plant (GAZ – Gorkovskiy Avtomobilniy Zavod). Vehicles were originally built using US parts kits, but GAZ began producing near copies of the original Ford vehicles as the GAZ A and GAZ AA. When Ford began producing the Model B, GAZ introduced the similar GAZ-M1. Ford was also instrumental in the 1929 construction of another facility that would later become involved in armoured car production. Built to assemble the Model A and Model AA from parts kits, the Moscow Car Assembly Factory operated as a subsidiary of GAZ from 1933–39. It was commonly known as KIM (Zavod imeni Kommunisticheskogo Internatsionala Molodezhi – Communist Youth International) as the factory was later named for that organization. Although other US companies, such as the Hercules Motors Corporation and the Arthur J. Brandt Company, made significant contribution to the Soviet Union's motorization, it was the Ford Motor Company that played an unintended but vital role in the Red Army's development of armoured cars.

Soviet armoured cars were divided into two classes, based on armament rather than weight: heavy armoured cars were equipped with cannons and light armoured cars were armed only with machine guns.

This title focuses primarily on Soviet armoured cars that served in operationally significant numbers. There were many other armoured cars that only reached prototype stage or were produced in small batches for trials. The vehicles covered here are presented in roughly the order in which they entered service.

This unidentified armoured unit, from left to right, includes a Garford armoured lorry, an Austin, two Sheffield Simplex hybrids and an Armstrong-Whitworth. (Nik Cornish at www.Stavka.org.uk)

# ARMOURED CAR TYPES

## BA-27 and BA-27M

| BA-27 Specifications | |
|---|---|
| **Crew** | 4 |
| **Primary armament** | 1x 37mm Hotchkiss cannon and 1x 7.62mm DT machine gun |
| **Armour (mm)** | Hull front: 8 |
| | Hull side: 8 |
| | Turret front: 8 |
| | Turret side: 8 |
| **Engine** | 35hp/40hp |
| **Driving range (km)** | 285 (road) |
| | 150 (cross-country) |
| **Speed (maximum, km/h):** | 45 (road) |

Two BA-27s with BA-I armoured cars behind parade in the 1930s. The hull configuration was similar to most other armoured cars and constructed of riveted armour plate. In the front armour plate, two armoured flaps with vision slits served as the primary observation devices for the driver and commander, and there was a similar flap in the rear of the hull. There were doors on each side of the vehicle. The hexagonal turret was very similar to that of the T-16 light tank. On the top of the turret, a mushroom-shaped cupola equipped with vision slits provided both observation and ventilation. The primary armament consisted of a 37mm cannon with 40 rounds and a 7.62mm DT machine gun with 2,016 rounds. (Author)

The BA-27 (BA = Broneavtomobil – Armoured Car) represented the first in a new era of Soviet armoured car designs, replacing the sizable, varied and largely decrepit fleet of armoured cars that remained after the Russian Civil War. It played a key role in the mechanization of the Soviet Army and the organizational changes that accompanied it.

An initial proposal to use an imported German truck chassis as the basis for the new vehicle was rejected in favour of the domestically produced AMO F-15 1.5-ton truck chassis.

The BA-27 was relatively heavy at 4,100kg, especially for a 4x2 (four wheels with two driven) chassis, and consequently its mobility was limited. In response, the armoured body was fitted on a 6x4 chassis. This improved the vehicle's mobility substantially and enabled the use of removable auxiliary tracks around the rear wheels for use when the terrain was particularly poor. The new vehicle entered service in 1931 as the BA-27M, essentially as a stopgap measure while a purpose-built 6x4 armoured car was developed.

Two hundred and fifteen BA-27s were delivered before production ended in 1931. They played an important role in equipping the new mechanized brigades that were being formed as part of the mechanization of the Red Army. Most were stationed in the western part of the Soviet Union, as Poland was seen as the primary external threat. BA-27s gave useful service in Central Asia, where 24 were used by the Unified State Political Directorate (OGPU), the predecessor organization of the NKVD, against rebellious gangs during 1931–33. At least

A BA-27M burns after being hit. The 6x4 configuration and the provision of auxiliary tracks would become the standard for all Soviet heavy armoured cars. (Author)

two took part in the Winter War with Finland in 1939–40, but all were apparently lost in action.

Approximately 170 BA-27s were still in service on the eve of World War II. Most were lost in the first several months of fighting, but a handful continued in action near Moscow and Leningrad as late as the spring of 1942. In the Far East, they served somewhat longer, with some still in service as late as August of that year. A number were captured by Germany and pressed into service. Eight BA-27s were exported to Mongolia in 1930.

## D-8 and D-12

| D-8 Specifications | |
|---|---|
| **Crew** | 2 (driver, commander/gunner) |
| **Primary armament** | 2x 7.62mm DT machine guns |
| **Armour (mm)** | Hull front: 7 |
| | Hull side: 7 |
| | Hull rear: 6 |
| | Hull bottom: 3 |
| **Engine** | 40hp |
| **Driving range (km)** | 225 (road) |
| | 150 (cross-country) |
| **Speed (maximum, km/h):** | 85 (road) |
| | 30 (cross-country) |

The light D-8 and D-12 were the first of the armoured cars that went into production in the 1930s. Development of the D-8 was undertaken in response to a military requirement for a 'fully armoured reconnaissance Ford-A' levied in September 1930. It was influenced by contemporary US armoured cars of which the D-8's designer at the KIM plant, N. Dyrenkov, was well aware. The D-8 replaced the heavy BA-27 and dispensed with the BA-27's turret and cannon armament. The lack of a turret allowed for a lower silhouette, a desirable feature in a reconnaissance vehicle. Developed

A D-8 under new management. Although they had ceased to be part of the active unit inventory, a few elderly D-8s and D-12s were used during the Winter War against Finland. At least three were lost in action and one – shown here – was captured and put back into service by the Finns. (SA-kuva)

concurrently, the D-8 was a specialized reconnaissance vehicle, while the D-12 had a different mounting for the armament that allowed it to be used in an anti-aircraft role.

Testing began in the spring of 1931. Reports from May of that year indicate that the D-8's interior space constraints greatly limited the machine gun's fields of fire – moving the single machine gun in action between the four ball mounts was not practical, and visibility for both the commander/gunner and driver was inadequate. The 4x2 chassis meant that cross-country mobility was very limited. Despite these shortcomings and the military's finding that they did not meet requirements, both the D-8 and D-12 were accepted for production.

A

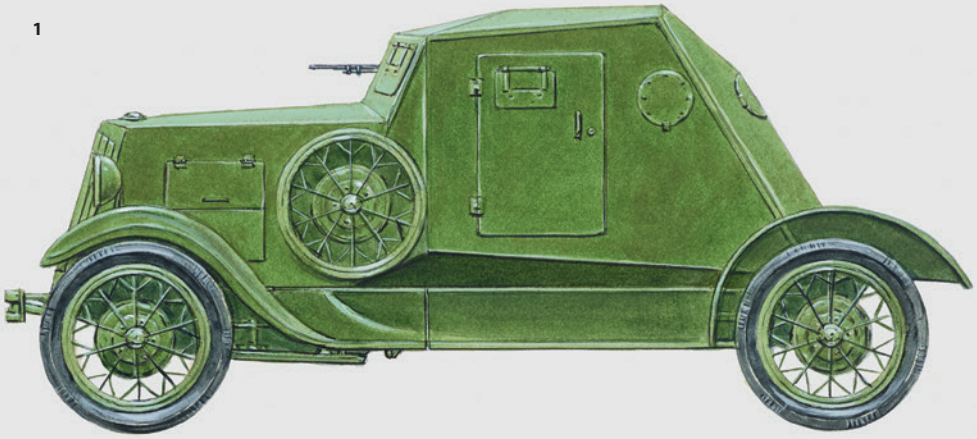
**The D-8, D-12 and BA-20M**

**1**. The D-8 was not a particularly successful vehicle and had a brief service life. It was cramped, and although it had mounts for the machine gun in the front, sides and rear of the hull, moving the machine gun between them in action wasn't practical. It was noteworthy in that it was one of the earliest armoured vehicles to be air-landed in support of airborne operations, Russia being a pioneer in this field.

**2**. The D-12 was developed alongside the D-8. Its ring mount and open top allowed its machine gun to be used against aircraft. Although shown here with an air-cooled DT machine gun, most contemporary photos show it fitted with a water-cooled Maxim instead.

**3**. A BA-20M in Finnish service. FAI and BA-20 armoured cars in Finnish service were designated as BAB B. They served in the Continuation War (1941–44), when Finland attempted to retake territory lost to Russia during the Winter War. At least 18 BAB B armoured cars served during the Continuation War, with 15 surviving until the end of the war. After the war they served with the Finnish police before being returned to the army for storage in 1946. They were finally declared obsolete in 1951.

1



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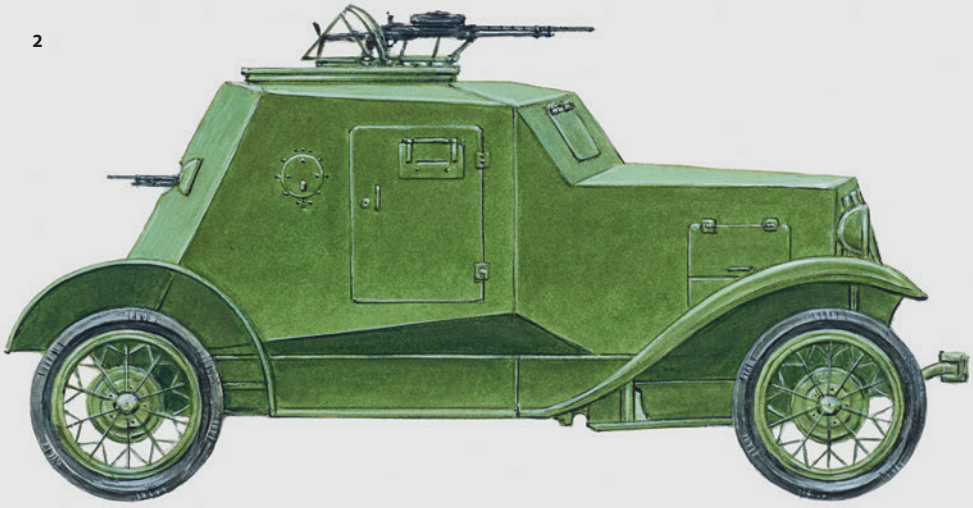

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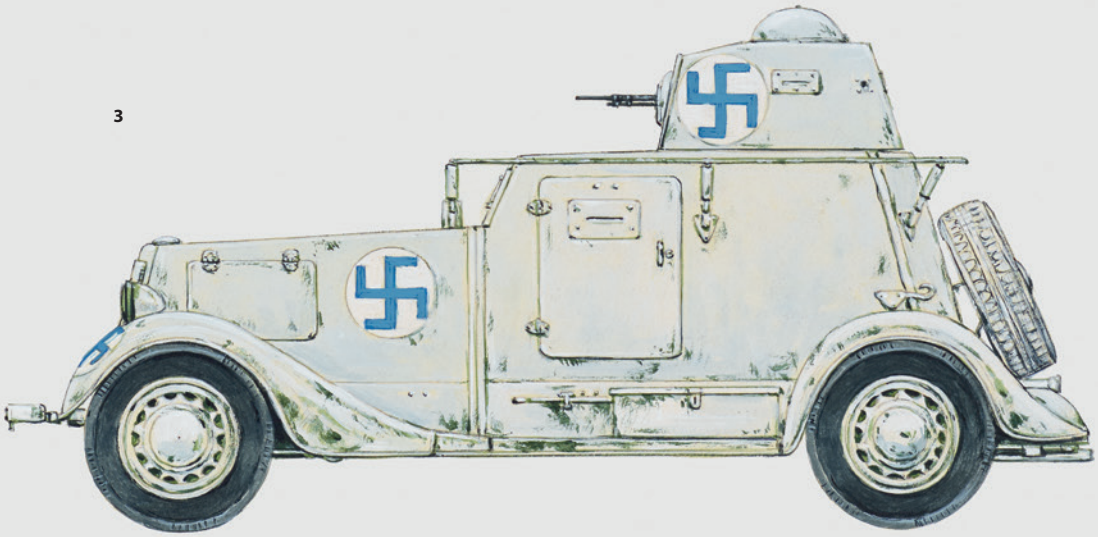


The hull of the D-8 featured sharply angled front and rear armour plates to improve ballistic protection. There were now only two machine-gun mounts, one in the front of the hull and the other in the centre of the hull rear. There were doors in each side for the driver and commander/gunner, a large hatch in the centre of the roof and a smaller hatch over the commander/gunner's position. Standard pneumatic automotive tyres were fitted. The D-12 had a largely open top and anti-aircraft mount for either a 7.62mm Maxim or DT machine gun, as well as less steeply sloped armour in the rear to provide additional room for the commander/gunner. Sixty D-8/D-12s were produced.

Their shortcomings led to a relatively short service life. They began to be replaced by the FAI in 1932 and were eliminated as a normal part of the force structure in 1938, being relegated to training institutions. Nevertheless, some D-8s and D-12s were later pressed into service. During the Winter War, three D-8s belonging to the 9th Army were lost in the fighting in Karelia, one D-8 belonging to the 177th Reconnaissance Battalion/163rd Infantry Division was captured by the Finns and another D-8 was recorded as being part of the inventory of the 114th Reconnaissance Battalion/84th Infantry Division. At the start of Operation *Barbarossa*, 45 were still in the inventory, distributed as follows:

| | |
|---|---|
| Moscow Military District | 8 |
| Leningrad Military District | 3 |
| Kiev Special Military District | 2 |
| Western Special Military District | 1 |
| Orel Military District | 1 |
| Odessa Military District | 2 |
| Kharkov Military District | 14 |
| Ural Military District | 5 |
| Volga Military District | 9 |

While none were considered combat ready, over half were listed as needing only minor repairs.

Two D-8s remained operational in the Leningrad Military District as late as 1942. In the Far East, they apparently soldiered on even longer, two D-12s making an appearance during a victory parade in September 1945.

Due to its small size and light weight, the D-8 was chosen for experimental testing in airborne units beginning in 1934. Here two D-8s are unloaded from beneath a TB-3 bomber, its normal carrier aircraft. Testing was successful and the 1936 Table of Organization and Equipment for an airborne brigade included a mechanized battalion with nine D-8s. By 1937 only one unit, the 13th Airborne Brigade, was equipped with D-8s, having received six. Its airborne service life was short, lasting only one year. (Author)

A D-8 was fitted with flanged wheels that fitted over the normal road tyres to enable it to run on rails, apparently only for trial purposes.

## BA-I

| BA-I Specifications | |
|---|---|
| **Crew** | 3 (driver, commander/turret gunner, hull gunner) |
| **Primary armament** | 1x 37mm Hotchkiss and 2x 7.62mm DT machine guns |
| **Armour (mm)** | Hull crew compartment front/side: 8 |
| | Hull engine compartment front/side: 7 |
| | Hull rear: 7 |
| | Hull bottom: 2.5 |
| | Hull top: 4 |
| | Turret: 8 |
| **Engine** | 40hp |
| **Driving range (km)** | 140 (road) |
| | 110 (cross-country) |
| **Speed (maximum, km/h):** | 63 (road) |
| | 48 (cross-country) |

The BA-I (I = Izhora) was the replacement for the BA-27/-27M. It was the genesis of a new series of armoured cars designed by the Izhora factory design team and became the basis for subsequent Russian heavy armoured cars. The BA-I design responded to a requirement for a three-axle armoured car, which would allow for greater armament and armour and better cross-county mobility. It was based on the Ford-Timken truck chassis that had recently begun being produced in quantity in the Soviet Union.

Like the BA-27M, it was armed with a 37mm Hotchkiss cannon and was based on a shortened Ford-Timken truck chassis, which made the vehicle more compact and permitted a modest increase in armour thickness. The limited anti-armour capability of the gun and the relative weakness of the chassis were well known, but both were readily available. A single vehicle was produced in 1932, and a further 109 were produced in 1933 and 1934 at the Vyksa Crushing and Grinding Plant.

The BA-I was mostly welded and the hull shape would be largely unchanged in later heavy armoured cars. The form of the turret was reminiscent of that used on the BA-27, but was larger to better accommodate the separate mounts for the 37mm cannon and DT machine gun. A second DT machine gun was fitted in the hull next to the driver.

**BELOW LEFT**
The stepped roof profile of the BA-I provided the necessary headroom for the driver and hull machine gunner, while reducing the overall height of the vehicle. The spare wheels moved freely and helped the vehicle avoid becoming hung-up on uneven ground. (S. Zaloga collection)

**BELOW RIGHT**
The BA-I builders' model. Auxiliary tracks could be fitted around the two sets of rear wheels, and when available were stored in boxes on the vehicle fenders. (S. Zaloga collection)

BA-Is on manoeuvres.The rear and side doors can clearly be seen in these photos. Its 40hp engine and 5,000kg weight left it underpowered and, despite the promise of increased cross-county capability provided by the three-axle chassis, largely road-bound. (S. Zaloga collection)

The BA-I carried 34 shells for the 37mm cannon and 3,024 rounds for the two machine guns.

As with the BA-27, the BA-I underwent a chassis change in 1938 as the Ford-Timken chassis was at the end of its service life. The decision was made to transfer the armoured car bodies to a shortened GAZ-AAA chassis, a relatively simple process. The front axle was reinforced, the springs thickened, bullet-resistant GK tyres fitted and an additional fuel tank was added to increase the vehicle's range. Designated the BA-IM, the upgraded vehicles entered service in 1939–40. One was fitted on an experimental basis with flanged railway wheels and another with 71-TK-1 radio set. The BA-IM continued in service through the early months of World War II, with some still in the inventory in the autumn of 1940:

| | |
|---|---|
| Moscow Military District | 2 |
| Kiev Military District | 11 |
| Orel Military District | 1 |
| North Caucasian Military District | 8 |
| Central Asian Military District | 1 |
| Trans-Baikal Military District | 48 |

B

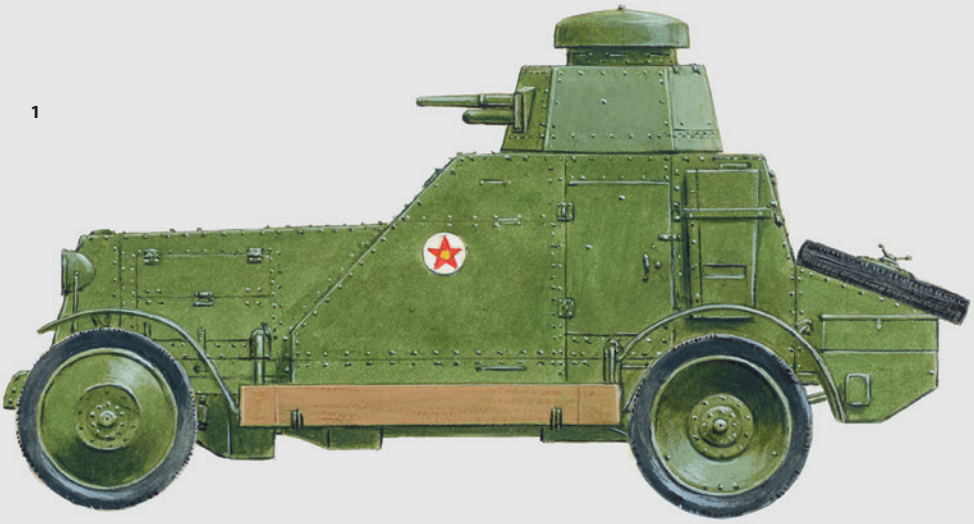
**The BA-27, BA-I and BA-6**

**1.** The BA-27. There were minor variations between the small production runs, including the armoured radiator covers. When not in action, the covers were stored as the side of the vehicle, as shown in this profile, taken from a period photograph.

**2.** The BA-I. This was the last of the Russian armoured cars with the inadequate 37mm Hotchkiss cannon and archaic turret layout with a separate ball mount for the turret machine gun. Although a few remained in service well into World War II, the limited performance of its gun and dwindling stocks of suitable ammunition made it generally unfit for combat.

**3.** The BA-6. About 20 per cent of the 394 BA-6s produced had 71-TK-1 radios mounted in the turret bustle at the expense of the ammunition stored there. Easily identified by the handrail antenna installed around the turret, they were normally issued to company and battalion commanders. This is the second vehicle of the 2nd Platoon, 1st Company, 2nd Battalion, 9th Armoured Car Brigade.

1



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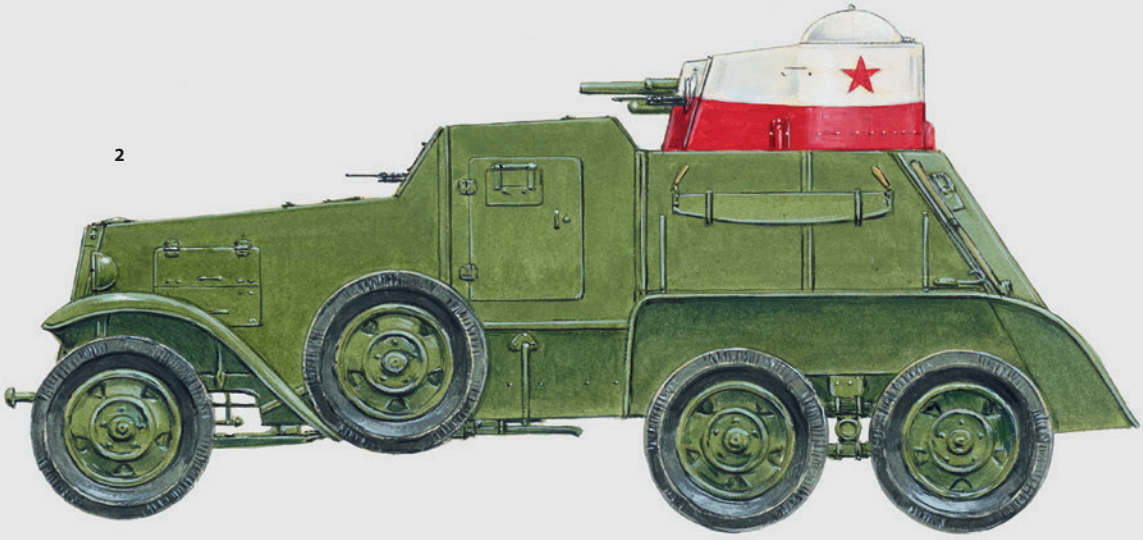

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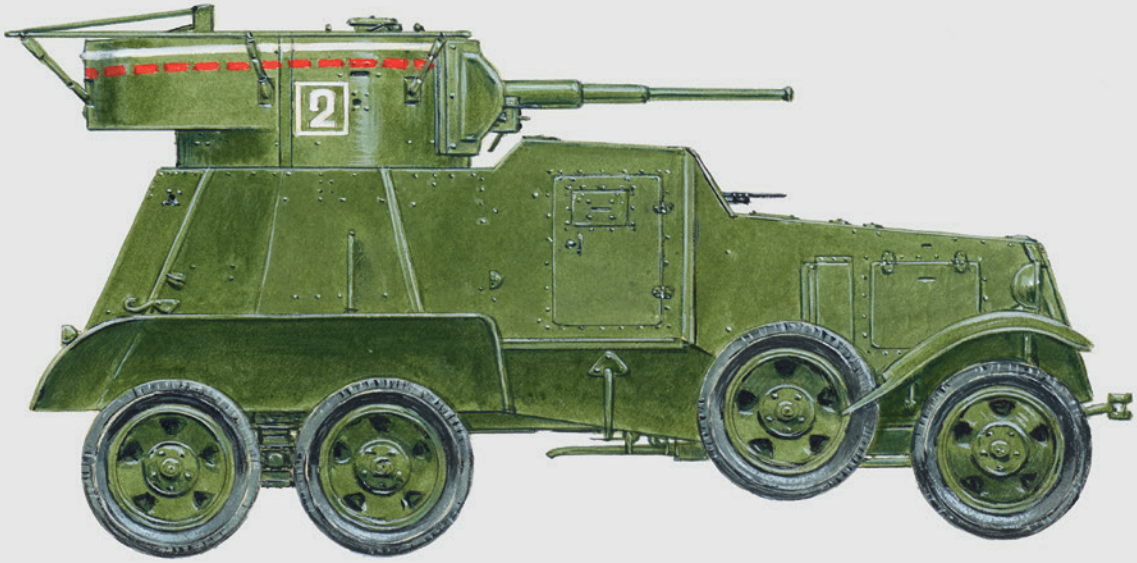


## FAI/FAI-M

| FAI Specifications | |
|---|---|
| **Crew** | 2 (driver, commander/gunner) |
| **Primary armament** | 1x 7.62mm DT machine gun |
| **Armour (mm)** | Hull front: 6 |
| | Hull side: 6 |
| | Hull rear: 4 |
| | Hull bottom: 3 |
| | Turret: 6 |
| **Engine** | 42hp |
| **Driving range (km)** | 200 (road) |
| | 170 (cross-country) |
| **Speed (maximum, km/h):** | 80 (road) |
| | 30 (cross-country) |

Even as production of the D-8 began, the Izhora design bureau produced a prototype of an armoured car that addressed one of the D-8's key shortcomings – a limited field of fire. The FAI (Ford A Izhorsky), however, was equipped with a turret and eventually a dedicated gunner that eased the workload on the vehicle commander.

The hull of welded steel plates had two armoured flaps in the font armour plate, one in each of the side doors and one in the rear of the hull on each side. Like the D-8, the FAI used the Ford A chassis and its specifications and performance were similar, except for the increased height resulting from the presence of the turret. (During production, the Ford A chassis would be replaced by its Soviet-produced copy, the GAZ-A.) The turret was elongated in shape to provide increased room for the gunner, who was provided with a canvas strap as a seat. Armament was a single 7.62mm DT machine gun.

Production began at Izhora, but due to the volume of orders for light tanks, production was shifted to Vyksa. The three-year production run ended

FAIs on exercise in the mid-1930s in the Kiev military district. Large exercises at this time were key to the development of operational concepts that accompanied the mechanization of the armed forces. (S. Zaloga collection)

in 1936 with 697 FAIs produced, including 30 for the OGPU. The UMM was not entirely satisfied with the FAI. A report from 1935 noted that the added weight of the turret at the rear of the vehicle reduced its mobility on unpaved roads even below that of the D-8. In addition, the armour of the FAI was only proof against small-arms fire. As the new BA-20 was entering production at Vyksa on the chassis of the GAZ-M1 automobile, the Izhora plant manufactured a small number of modernized FAI armoured cars on the same chassis under the designation FAI-M. The GAZ-MI chassis had a longer frame than the GAZ-A, and although the FAI-M was about 300kg heavier, it had a more powerful engine that made it slightly faster, a larger fuel tank that gave it greater range, and bullet-resistant tyres. Seventy-six were manufactured.

This photo clearly shows the FAI's distinctive hemispherical bulges in the top of the hull and turret armour, provided to increase headroom for the crew. (S. Zaloga collection)

Eight FAIs were converted to rail scouts (FAI-Zhd). As with the D-8, this was accomplished by fitting them with flanged wheels that fitted over the vehicle's tyres. All were part of a single battalion in the Far East, where they successfully served until August 1945. On the eve of the German invasion in 1941, the following FAI/FAI-Ms were in the inventory, mainly in the eastern part of the country:

| | |
|---|---|
| Moscow Military District | 9 |
| Leningrad Military District | 41 |
| Western Special Military District | 21 |
| Baltic Special Military District | 6 |
| Orel Military District | 2 |
| Odessa Military District | 18 |
| Kharkov Military District | 2 |
| Volga Military District | 5 |
| Ural Military District | 3 |
| North Caucasus Military District | 4 |
| Transcaucasian Military District | 3 |
| Transbaikal Military District | 104 |
| Far East Military District | 122 |
| Arkhangelsk Military District | 1 |
| In storage | 18 |

As with the D-8/D-12, the FAI soldiered on the longest in the relatively quiet Far East, with 14 still in combat service in late 1942, and a number participating in the end-of-war victory parade there.

In 1936, 20 FAIs were provided to the Republicans in Spain. Mongolia acquired 15 FAIs, where they served in the armoured squadrons of the cavalry divisions. Finland and Germany captured a number of FAIs, using them for rear area security duties.

## BA-3 and BA-6

| BA-3/6 Specifications | |
|---|---|
| **Crew** | 4 |
| **Primary armament** | 1x 45mm and 2x 7.62mm DT machine guns |
| **Armour (mm)** | Hull front: 8 |
| | Hull side: 8 |
| | Hull top: 8 |
| | Hull bottom: 5/3 |
| | Turret: 8 |
| **Engine** | 40hp |
| **Driving range (km)** | 248/265 (road) |
| | 143/150 (cross-country) |
| **Speed (maximum, km/h):** | 75/52 (road) |

The short 37mm Hotchkiss that armed the BA-27 and BAI was a lightweight, compact and useful infantry support weapon, but it was a dated design – it originated as a naval weapon in the latter part of the 19th century – and lacked the anti-armour capability of weapons coming recently into service. A 45mm cannon, adopted in 1932, would become the standard Russian anti-tank weapon of the 1930s, being mounted on light tanks, on towed mounts and in heavy armoured cars. Capable of penetrating 51/35mm of armour at 100/1,000m respectively, it was effective against almost all contemporary tanks. The mediocre performance of the 37mm Hotchkiss was addressed by a new vehicle that essentially mated the BA-I's hull and the turret of the new T-26 Model 1933 light tank mounting the 45mm cannon. Minor modifications were made to the BA-I's hull, and conversion of the hull to carry the new turret was a simple process. The resulting vehicle was designated the BA-3 and production began in 1934. In 1935, two variants underwent testing. The first involved the mounting of a radio in the turret bustle and the second was the usual provision of the flanged wheels for railway use, but this was not adopted.

Given its hull and turret had already independently passed military acceptance testing, it is unsurprising that the BA-3 also passed developmental testing without major issues. Visibility at speed and engine cooling – problems that plagued virtually all Soviet armoured cars – were noted as shortcomings to be corrected in series production.

Like the BA-I, the BA-3 had a relatively short production run of 172–180 vehicles, produced from 1933–36. They saw service mainly against Japan during the Khalkin–Gol campaign in 1937.

The BA-6 resulted from a 1935 UMM requirement for a new vehicle using the BA-3 body and the GAZ-AAA chassis, a move that would alleviate spare parts problems and reduce production costs. The new vehicle was externally very similar to the BA-3, except that the rear door and vision flap were eliminated in all but the earliest production models and an air scoop was fitted beneath the radiator to improve engine cooling. A number

A BA-3 comes to grief after being hit, the damage reflecting an explosion of the ammunition in the turret. Sixty rounds of 47mm ammunition were carried. Forty rounds were stored horizontally in two ammunition racks located in the turret bustle, and an additional six were stored along each side of the turret. Eight rounds were located in the hull, four on each side. The rear access door can clearly be seen. (Author)

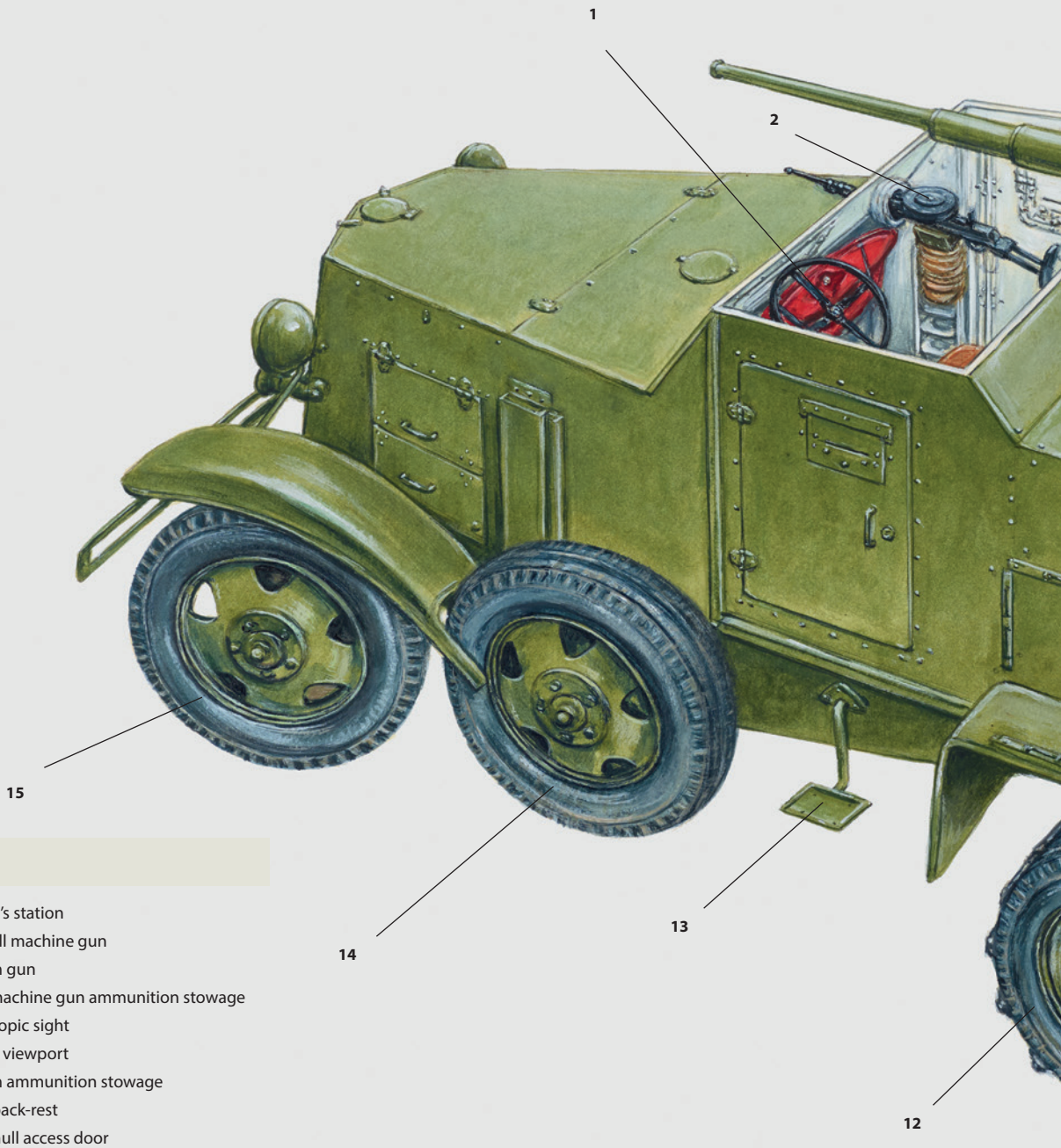
of internal and external detail changes were also made, such as use of metal rods rather than ropes to control the armoured radiator shutters, the addition of a pistol ports in the front and rear of the hull, and a change in the angle of the steering column.

The Izhora designers strengthened the attachment of the hull to the chassis and the suspension, while GK bullet-resistant tyres were fitted as standard in lieu of the conventional pneumatic tyres of the BA-3. Although the BA-6 was almost 1,000kg lighter than the BA-3 and had better performance, the use of the GK tyres reduced road range and speed by 8–10km/h. Designers attempted to improve the vehicle range by supplementing the existing 44l fuel tank with a second, 24l fuel tank. The placement of this fuel tank left much to be desired, as the gravity-fed tank was mounted on the inside of the hull above the driver's head, a problem highlighted during the fighting with Japan.

Given that the BA-6 differed little from its predecessor and the need for modern armoured cars, the BA-6 entered serial production before prototype testing was complete and entered service in the spring of 1936. That summer, operational use revealed a number of problems, including poor crew ergonomics, inadequate ventilation, and poor visibility and accuracy when firing on the move.

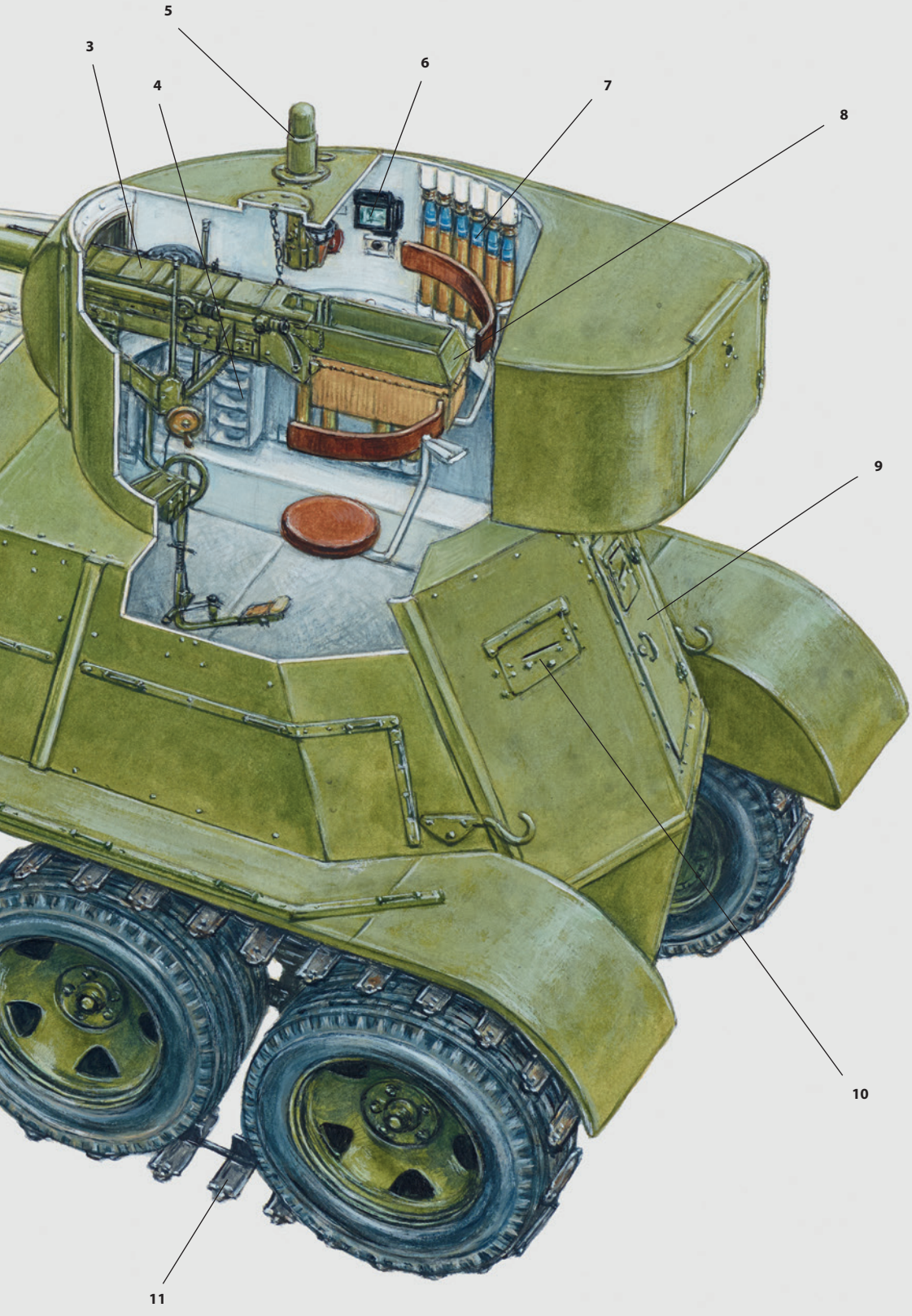
Beginning in 1936, a few were converted into armoured railway scouts by providing flanged railway wheels to replace the wheels on the first and third axles. These BA-6ZhD armoured cars served in the separate armoured train battalions until 1943.

Also in 1936, some 15–20 BA-6s, designated BA-6M, received a new 50hp engine from the GAZ-M1 and a new conical turret later used on the BA-10. The new more compact turret necessitated a reduction in ammunition storage from 60 to 50 45mm shells, 30 of which were in the turret. There were 3,150 7.62mm cartridges in 50 magazines for the two machine guns. Fifteen of these were located in the hull next to the machine gunner, 20 were stored further back in the hull and five were in the turret. Armour protection increased to 10mm and the 71-TK-1 radio was standard. The front axle




**KEY**

1. Driver's station
2. DT hull machine gun
3. 45mm gun
4. Hull machine gun ammunition stowage
5. Periscopic sight
6. Turret viewport
7. 45mm ammunition stowage
8. Seat back-rest
9. Rear hull access door
10. Rear hull view port
11. Overall supplementary track
12. Rear (powered) wheels
13. Foot rest
14. Spare tire
15. Front (steerable) wheel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received new springs, as well as two shock absorbers from the GAZ-M1. Thirty-five BA-6s were delivered to Mongolia in 1936.

## BA-20 and BA-20M

| BA-20/20M Specifications | |
|---|---|
| **Crew** | 3 |
| **Primary armament** | 1x 7.62mm DT machine gun |
| **Armour (mm)** | Hull front: 6/9 |
| | Hull side: 6 |
| | Hull rear: 4 |
| | Hull top/bottom: 3 |
| | Turret: 6/9 |
| **Engine** | 50hp |
| **Driving range (km)** | 350/450 (road) |
| | 270/335 (cross-country) |
| **Speed (maximum, km/h):** | 90/60–70 (road) |

The BA-20 and BA-20M were the principal light armoured cars of the pre-war Soviet Army, equipping the reconnaissance elements of the motorized brigades, mechanized corps and armoured train battalions. They slowly replaced the FAI and served well into World War II.

The relative automotive and structural weakness of the Ford A/GAZ-A chassis precluded any meaningful improvement in the performance, protection or armament of any armoured cars based on that chassis. Ford had introduced the Model B in 1932, and the 1934 Model B served as the basis for the GAZ-M1 passenger car. Unlike the GAZ-A, which was essentially a metric copy of the Ford A, the GAZ-M1 featured a number of improvements over the Ford B. Most important was a stronger suspension better suited to the poor local roads. The chassis was more robust, the transmission more sophisticated and the engine more powerful than its GAZ-A predecessor.

Given the lack of an alternative, the GAZ-M1 chassis was the natural starting point for an improved light armoured car. The drive train and suspension of the GAZ-M1 chassis was further strengthened and series production began in 1936. By the end of that year the Vyska plant produced 35 BA-20s, including two fitted with a radio. Despite the increased weight of the chassis and armour, the BA-20's improved automotive performance and mobility improvements were noteworthy. The only significant deficiency noted by military evaluators was the light armament – the same single 7.62 mm DT machine gun found on the D-8 and FAI/FAI-M. Secondary armament was 15 F-1 grenades.

The BA-20 was very similar in configuration and overall appearance to the FAI. The most obvious visual difference between the two was the BA-20's lack of hemispheric bulges in the hull roof above the driver and commander. It had significantly better off-road performance than the FAI-M and bullet-resistant tyres.

In 1938, an improved version of the BA-20 was introduced as the BA-20M. While the BA-20's turret sides were vertical, those of the BA-20M sloped, somewhat increasing the effective armour protection without an increase in the armour thickness itself. On some BA-20Ms an improved 71-TK-3 radio was fitted, with the frame antenna of the original radio set replaced with a

BA-20M armoured cars in Moscow. Note the sloped walls of the turret; the earlier BA-20 featured vertical turret sides. (S. Zaloga collection)

rod antenna. In addition, the fuel tank was enlarged, increasing the vehicle's range. The BA-20M's hull was slightly different and lower in height than the original model. Some sources indicate that the suspension was strengthened, and the front and turret armour increased to 9mm.

Production delays hampered the BA-20M's entry into service. In particular, there was a shortage of the new conical turrets and the bullet-resistant tyres often failed to meet specifications. Other issues plagued the production run. These included shortages of radio equipment, machine guns and qualified workers resulting from conscription.

A rail scout version was developed concurrently with the BA-20M and accepted for series production. They carried the designation BA-20ZhD and most were based on the BA-20M. Flanged wheels replaced the usual wheel/tyre combination.

Production of the BA-20/20M ended in 1942 after 2,132 vehicles, including 134 rail scouts, were manufactured.

**BELOW LEFT**
A captured BA-20M – German designation Panzerspähwagen BA 202 (r) – pressed into service by an SS unit is secured to a railway flatcar as the officer supervising the process uses the prominent radio antenna as a convenient handhold. The normal ball mount in the turret for the DT machine gun has been replaced by a simple hatch in which a German MG-34 machine gun could be fitted. Germany used its captured BA-20s in less demanding roles, such as anti-partisan operations, transport for military police and, as shown here, for war correspondents. (NARA)

**BELOW RIGHT**
The crew of a BA-20Zhd conducts railway repair work. They patrolled along the long railway lines of communication, conducted reconnaissance of enemy positions and served as scouts for armoured train units. Two of the vehicle's road tyres can be seen stored on the hull sides, with a portion of the remaining two barely visible on the rear of the hull. (Author)

## BA-10 and BA-10M

| BA-10 Specifications | |
|---|---|
| **Crew** | 4 |
| **Primary armament** | 1x 45mm and 2x 7.62mm DT machine guns |
| **Armour (mm)** | Hull front: 10 |
| | Hull side: 10 |
| | Turret: 10 |
| **Engine** | 50hp |
| **Driving range (km)** | 280 (road) |
| | 200 (cross-country) |
| **Speed (maximum, km/h):** | 63 (road) |
| | 38 (cross-country) |

The BA-10 was the most important Russian armoured car of World War II. Development began in 1937 and series production was scheduled to start the same year, but preparations for production and design changes delayed the start of production until January of the following year. From an operational perspective, the most significant feature was that all BA-10s were intended to have a 71-TK-1 radio, a key feature for a reconnaissance vehicle, but due to a shortage of radio sets not every BA-10 received one. A whip antenna replaced the prominent handrail-style antenna.

Numerous detail changes were introduced, including the addition of a hatch on top of the engine compartment to improve cooling, relocation of door and hatch hinges to the interior of the vehicle and the addition of flanges to openings to prevent bullet splash from entering the vehicle. Electrical wiring and other engine components also received additional protection. Two 59l fuel tanks were mounted internally on the hull roof behind the driver and machine gunner.

Not surprisingly, testing revealed many of the same flaws found on the BA-6: most notably poor crew ergonomics, ventilation, visibility and location of the fuel tanks. The latter issue would be addressed with the start of BA-10M production in December 1939. The interior tanks were replaced by two fuel tanks covered by an armoured cover on each side, mounted on the mudguards above the rear axles. In addition, the fuel lines were protected by armoured channels. A few late production standard BA-10s also

German soldiers inspect a pair of BA-10s in Lublin, Poland, in 1939. The DT machine gun was mounted in a box-like protrusion in the front armour plate to provide more working room in the interior. The auxiliary tracks rest on the rear mudguards. (Bundesarchiv, Bild 101I-013-0068-20A / Fotograf(in): Höllenthal)

BA-10Ms on patrol near Leningrad in 1941. (J. Ledwoch)

An abandoned BA-10. The remains of its light camouflage cover the tracks that could be fitted to the rear pairs of wheels to improve the cross-country performance. (Nik Cornish at www.Stavka.org.uk)

A pair of BA-10M armoured cars acting as personnel carriers. They both appear to have their tracks fitted. (Nik Cornish at www.Stavka.org.uk)

Two examples of BA-10Ms lost in combat. (Nik Cornish at www.Stavka.org.uk)

had the new fuel tanks. The BA-10M featured a new radio and a number of other minor improvements, including crew comfort enhancements. About 3,400 of both the BA-10 and BA-10M were produced.

As was now standard Russian practice, 20 were fitted with flanged steel wheels for use as armoured railway scouts and designated BA-10ZhD. These were mounted on the first and third axles, much as with the BA-6ZhD, and carried on the hull sides and rear when not in use.

## BA-11

| BA-11 Specifications | |
|---|---|
| **Crew** | 4 |
| **Primary armament** | 1x 45mm and 2x 7.62mm DT machine guns |
| **Armour (mm)** | Hull front: 13 |
| | Hull side: 10–13 |
| | Turret front: 13 |
| | Turret side: 13 |
| | Hull top: 8 |
| | Hull bottom: 4 |
| **Engine** | 93–99hp |
| **Driving range (km)** | 316 (road) |
| | 178 (cross-country) |
| **Speed (maximum, km/h):** | 64 (road) |

Although most Russian armoured car designs were the product of collaboration between the Izhora design bureau and GAZ, Izhora did partner with another Russian manufacturer well known for its trucks, the Moskovsky Avto Zavod imeni Stalina (ZiS), as early as 1935. Although their heavy armoured car project, the BA-5, was not accepted for production, they quickly followed with a new design that would become the BA-11.

Based on the 6x4 ZiS-34 chassis, a shortened derivative of the ZiS-6, the prototype BA-11 was similar to the BA-10 in general configuration. However, it was larger, heavier (8,130kg versus 5,140kg), had a better ballistic shape and thicker armour than the BA-10. The large 93–99hp engine, coupled to

a new transmission with nine forward and six reverse gears, gave it good cross-country and road mobility despite the vehicle's weight. Like other Russian heavy armoured cars, auxiliary tracks could be fitted around the rear wheels for use in poor terrain.

A knocked-out BA-10. Note the tracks mounted on the rear hull. (Nik Cornish at www.Stavka.org.uk)

It carried the typical heavy armoured car armament of a 45mm cannon and two machine guns. Ammunition storage was a very substantial 104 45mm shells, carried in two 32-round and four ten-round racks. Although the quantity of shells carried was much larger than that of the BA-10, their inconvenient placement reduced the BA-11's rate of fire (five rounds per minute) to less than half of that of the BA-10. There were 49 magazines for the DT machine guns, and 20 F-1 fragmentation grenades for the crew carried in bags attached to the seat backs.

The 71-TK-1 radio was fixed to the right wall of the driver's compartment, and the rod antenna was mounted directly outside on a rotating base that enabled it to be lowered into a horizontal position along the hull in order to avoid interfering with the turret's traverse. For internal communication the crew was provided with a TPU-2 intercom.

The instrument panel had a speedometer, temperature and pressure gauges, clock, ignition switch with indicator light, fuel level gauge, dashboard light and switch for the interior lighting.

Stored around the interior were boxes with cannon-related equipment and tools for the machine guns, a vehicle tool box and first aid kit. There were also explosives for destroying the vehicle should it need to be abandoned, an engine crank, saw, axe, crowbar, replacement antenna, fire extinguisher, bucket, tarpaulin and rope.

BA-10Ms in winter camouflage. Elaborate camouflage schemes such as this were atypical, with overall white being the norm. (J. Ledwoch)

It was accepted for service in 1939, but only 16 were delivered. Production of the BA-11 started slowly due to existing orders for the BA-10 and other vehicles, but ended after the Izhora plant in Leningrad became isolated.

The following year, a diesel engine version – the BA-11D – was introduced. The BA-11D was Russia's first diesel-powered armoured car, and provided both an increase in range to 420km and a reduction in the risk of fire. However, the installation of the 97.5hp diesel

An early BA-11. These models had simple louvres over the radiator instead of the later armoured flaps; a fixed antenna mount; simple plug-type pistol ports; and a hatch in the rear of the turret. (S. Zaloga collection)

engine increased the BA-11D's weight to 8,650kg and decreased the speed by almost 20km/h. A shortage of diesel engines precluded production.

While most sources suggest the BA-11s were lost in combat around Leningrad, one indicates that only a single BA-11 saw service there until the end of the war in a separate armoured car battalion, a composite unit equipped mainly with BA-10s. This source suggests that eight BA-11s were assigned to the Kiev Military District, and that others also served in the Moscow and Volga military districts.

## BA-64

| BA-64 Specifications | |
|---|---|
| **Crew** | 2 (driver, commander/gunner) |
| **Primary armament** | 1x 7.62mm DT machine gun |
| **Armour (mm/°slope)** | Crew compartment front: 15/40 |
| | Crew compartment upper side: 9/30 |
| | Crew compartment upper rear: 9/30 |
| | Crew compartment lower rear: 6/35 |
| | Crew compartment top: 6 |
| | Engine compartment front: 9/52, 9/30, 6/30 |
| | Engine compartment top: 6/84 |
| | Turret: 10/30 |
| **Engine** | 50hp |
| **Driving range (km)** | 550 (road) |
| | 335 (cross-country) |
| **Speed (maximum, km/h):** | 80 (road) |
| | 25 (cross-country) |

The BA-64 was the most numerous of the Soviet armoured cars, the first to have all-wheel drive and the only one to be mass-produced during World War II. It was originally envisioned as a liaison vehicle, but eventually served in a variety of roles, including reconnaissance, command, resupply, armoured personnel carrier and light prime mover for anti-tank guns.

Development of the BA-64 began at GAZ on 17 June 1941, less than a month after the start of Operation *Barbarossa*. It was based on the chassis of the GAZ-64, a jeep-like 4x4 light vehicle already in production. The GAZ design bureau originally planned to use the modified body of the BA-20, the vehicle the BA-64 was intended to replace. However, the BA-20's weak armour protection and inefficient body shape led them, after examining a captured Sd.Kfz. 221, to opt to use a highly faceted body very similar in

shape to that of the developmental Soviet LB-62 armoured car. The LB-62 was likely influenced by German armoured car design principles, of which the Soviets were well aware from the pre-war period of close cooperation with Germany in armoured vehicle design.

The small hull was fabricated from welded steel plates. It used thicker plates than previous designs, and the faceted body gave it an excellent ballistic shape that further increased its protection beyond even its heavy armoured car predecessors. There was a hatch on each side of the body next to the driver's position. The two-man crew sat in tandem. The driver had a single vision device incorporating triplex armoured glass and the commander/gunner had a similar vision device in each side of the vehicle's small open-top turret. About 40 per cent of production vehicles were fitted with a radio. The RP-12 radios originally fitted had a battery life of only 20 hours, which limited their use.

At least three prototypes were constructed. Early models had mesh anti-grenade screens over the small open turret, much like the German Sd.Kfz. 221/222, and two sets of armoured louvres in front of the radiator. During testing, the anti-grenade screens proved to be a hindrance and were only included on vehicles constructed during the first two months of series production. Production vehicles also had the upper set of radiator louvres replaced with a piece of solid armour plate to improve protection of the radiator. The lower set of louvre armoured strips was enlarged to the full width of the vehicle. Cooling for both driver and engine remained a problem, and air intakes were added to the front edge of the hull roof and the top of the engine soon after the start of series production in April 1942.

Primary armament was a single 7.62 mm DT machine gun. This was mounted on a column fixed to the hull floor, and a hand wheel allowed it to be raised clear of the turret for anti-aircraft use. The column was also connected to the turret by tubular supports that allowed the turret and machine gun to be rotated 360 degrees. Traverse was manual and could be locked when the vehicle was in motion. The commander had a small seat. Twenty magazines holding 1,260 rounds were carried (17 magazines with 1,071 rounds in vehicles equipped with a radio). Six F-1 fragmentation grenades (later increased to eight) and the crew's personal weapons were also carried.

The BA-64 was fitted with off-road, bullet-resistant tyres and cross-country mobility was very good. In order to improve road speed, the tyres were replaced with those from the civilian GAZ-M1 passenger car for extended road marches and in rear areas. The engine was very reliable, could operate on low-quality fuel and needed little maintenance.

In September 1943, the externally very similar BA-64B was introduced into service. It was based on the GAZ-67, an improved version of the GAZ-64 with a wider track (the distance between the wheels on an axle), larger fuel tank and other mechanical and structural improvements. The BA-64 had a high centre of gravity that made it prone to overturning, and the wider track gave the BA-64B greater stability, particularly on side slopes. Operational use revealed that the driver's visibility on the original BA-64 was inadequate, so round observation/pistol ports were added to the hull sides for use by the driver on all but the earliest BA-64Bs; some late-production BA-64s also featured these ports.

The GAZ design team developed a number of variants to increase the BA-64's mobility and firepower and broaden the number of roles it was able

Two BA-64s and a Lend-Lease M3A1 scout car from the 6th Tank Army in Romania during autumn 1944. During this period of the war it was common for photos to show the two vehicle types operating together. (J. Ledwoch)

to perform. However, none of these were produced in quantity.

**BA-64Z** – a halftrack designed for winter use. The rear wheels were replaced with tracked suspension units made up of components from the GAZ-60 halftrack truck, and the front wheels by skis. Testing during 1942–43 demonstrated that although it had good cross-country performance, it was underpowered and suffered from a very slow speed and high fuel consumption, which limited its range. Another design had the front wheels replaced with tracked suspension units as well, but this would have undoubtedly shared the shortcomings of the halftrack prototype.

**BA-64Sh** – a command and staff vehicle, sometimes known as the BA-64E, developed in the autumn of 1942. The turret was removed and the lines of the upper hull extended upwards. To further increase space, the DT machine gun was moved to a pintle mounted on the hull roof. It had three seats, but there was no room for a radio, a critical shortcoming for what was intended as a command vehicle.

**BA-64E** – an armoured personnel carrier based on the BA-64B and developed in the spring of 1943. This turretless, open-topped vehicle featured two additional firing ports in the sides of the vehicle, as well as a door in the rear. It carried six passengers and three prototypes were constructed, but it must have been too small to be a practical solution for carrying combat-equipped infantry. The arrival of large numbers of lend-lease halftracks and M3A1 scout cars addressed the immediate need for armoured personnel carriers, and the BA-64E did not enter series production. Another six prototypes having different configurations were produced before the end of the war. These included an anti-tank vehicle with a 37mm gun for airborne troops and a command vehicle equipped with a radio.

**D**

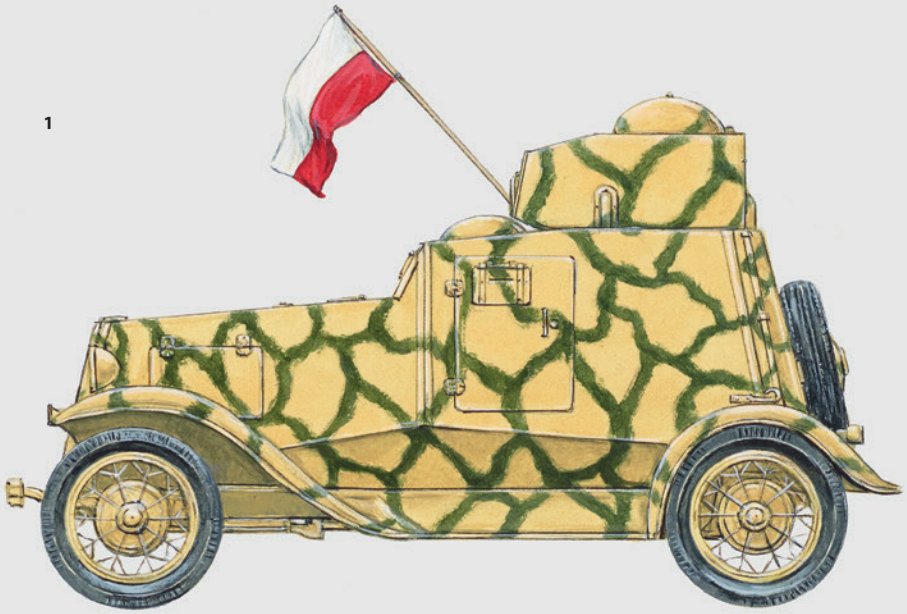
**The FAI, FAI-M and BA-64B**

**1.** An FAI changes ownership for the second time. Used by Germany for rear-area security in occupied Warsaw, this FAI was among the equipment captured in an attack on 1 August 1944 by a company from the Rucjaz battalion of the Polish Home Army. Carrying the Polish flag in the machine-gun mount, it was used for propaganda purposes within the Polish lines.

**2.** The FAI-M. The GAZ-M1 chassis on which it was based was longer than that of the Ford/GAZ-A, giving the FAI-M a distinctive 'tail'. The tactical marking identifies the vehicle as belonging to the 3rd company of the 2nd battalion – the colours of the upper and lower bands denoting the battalion and company respectively.

**3.** The BA-64 B was the most numerous Russian armoured car and served in a wide variety of roles. The diminutive vehicle was agile but cramped, and was lightly armed with a single machine gun in an open-topped turret. As seen here, the turret could be fitted with a canvas cover for protection from the elements. While most Russian armoured cars were unmarked, as the war progressed, tactical signs and patriotic slogans began to be seen more frequently. This late-war BA-64 carries the exhortation 'To Berlin'.

1



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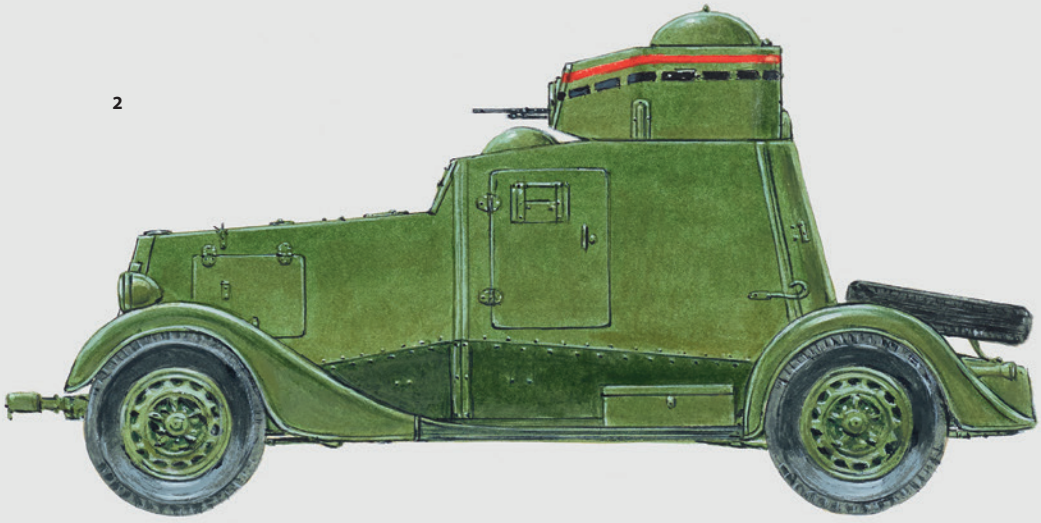

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**BA-64ZhD** – an armoured rail scout. Two versions were competitively developed, one by the GAZ design team and the other at Vyksa. On the Vyksa version (also known as the BA-64V), the crew replaced the standard wheels with flanged railway wheels, a process which took about 30 minutes. The GAZ version (BA-64G) kept the standard tyres and used small flanged auxiliary wheels at the front and rear of the vehicle. These could be manually raised or lowered in approximately one minute. A few BA-64s were also fitted with flanged railway wheels by the Moscow Wagon Repair Plant and served as rail scouts for armoured trains.

**BA-64D** – Also known as the BA-DshK-64B, this vehicle was intended to address requirements for increased firepower. It mounted a 12.7mm DshK machine gun in a larger turret. Testing revealed feeding problems and reduced accuracy from the weapon's considerable recoil. In addition, it quickly became apparent that even with the larger turret, the arrangement was too cramped to be practical. An attempt to fit the newer 7.62mm SG-43 machine gun in a standard BA-64B in 1944 failed for some of the same reasons – poor accuracy and ergonomics.

The BA-64's light armour and armament made them unpopular as combat vehicles. The addition of the armoured body stressed the chassis, causing high failure rates and necessitating a series of chassis modifications. However, in their intended function as liaison vehicles, as well as in roles that capitalized on their good mobility – reconnaissance, resupply and rear area protection – they served a useful role.

Production ended in 1946, with a total of 9,110 BA-64s – 3,901 BA-64s and 5,209 BA-64Bs – being manufactured. Of these, 8,174 were manufactured during the war years and about 3,300 were still in service at the end of the conflict.

## Specialized armoured cars

Russia developed a number of special-purpose armoured cars, most of which did not proceed beyond the prototype stage. These included a series of amphibious and chemical warfare armoured cars, as well as an armoured medical evacuation vehicle.

The BAD-1 was designed by political prisoners in 1932 for the OGPU to use for internal security purposes. It was long and narrow and had two turrets staggered in height, which gave the vehicle a distinctly ship-like appearance. Each of the turrets was equipped with a single DT machine gun, and there was a third machine gun mounted in front of the hull next to the driver. Long armoured skirts ran the length of the vehicle, leaving only a small portion of the vehicle's tyres exposed, which contributed to the vehicle's naval impression and undoubtedly made cross-country travel a virtual impossibility. It could also be converted to run on railway lines. Apparently only a single vehicle was produced, leaving the OGPU to rely on the much more practical BA-27 for its internal security duties during this timeframe.

The BAD-2 prototype was the first of a series of amphibious armoured car designs that paralleled the fielding of amphibious light tanks for reconnaissance purposes. The OGPU's political prisoners also did the preliminary design work on this vehicle before development was handed over to the military. It was similar in overall appearance to the BAD-1, but the hull had a more streamlined, hydrodynamic shape and the upper turret mounted

a 37mm Hotchkiss cannon instead of a machine gun. There was a propeller that remained engaged regardless of whether the vehicle was on land or afloat. Performance on both water and land was poor, the engine overheated and the armoured car had difficulty negotiating the transition from one mode to the other except where the terrain was particularly favourable. A small number of an improved version, the BAD-3, were made.

A second amphibious design was the PB-4, prototypes of which were constructed in 1933. Essentially an amphibious version of the BA-3 armoured car, it had large wooden pontoons covered in sheet metal to increase buoyancy and, like the BAD-2, a propeller that was always engaged. Unlike the BA-3, the turret was cylindrical. The elimination of the turret bustle caused it to be unbalanced and difficult to traverse, in addition to reducing the amount of 45mm ammunition carried. Six PB-4s were built for testing, which revealed a problem with the vehicle's watertight integrity and many of the same issues as had been encountered with the BAD-2, including the seemingly perennial problem of inadequate cooling. One PB-4 served briefly in an active unit and the remainder went into storage.

Undaunted, Soviet designers began work on yet another amphibious armoured car, the PB-7, in late 1936. The PB-7 was similar to the PB-4, but the hull was more compact and streamlined, had improved seals to prevent water from entering the hull and a smaller turret with sloping sides that mounted a 7.62mm machine gun. The new turret allowed a reduction in the crew from the four of the PB-4 to three. The compactness of the vehicle, coupled with a more powerful engine, resulted in a vehicle that was lighter than the PB-4, had better performance and slightly thicker armour. Despite the improvements and the finding that the vehicle was acceptable for service, the decision was made to abandon the fielding of amphibious armoured cars and to rely on amphibious light tanks to negotiate the many water obstacles found in the western region of the Soviet Union.

To facilitate the evacuation of wounded from the battlefield, the BA-22 armoured ambulance was developed in 1938. It was based on a modified GAZ-AAA three-axle chassis, much like the BA-10. At the rear of the vehicle was a large box-like compartment with double rear doors that could accommodate four stretchers or ten seated wounded. It was rejected for service for a number of reasons, including being underpowered, too tall and not meeting the medical requirements for the transportation of casualties.

The Soviets had recognized the need for an armoured personnel carrier early, and the BA-22 had also been evaluated for use in that role. In 1939, the designers at ZIS developed a halftrack armoured car, the B-3, that was intended primarily as an armoured personnel carrier. It used the suspension of the T-40 light tank and was similar to later US halftrack armoured personnel carrier designs. It was, however, slow, with a speed of only 40km/h, and was not accepted for service.

Another type of special-purpose armoured car for which the Soviets anticipated a requirement was a chemical warfare vehicle, specifically for the dissemination of chemical warfare agents, the decontamination of terrain and the laying of smokescreens. N. Dyrenkov, the designer of the D-8 and D-12, developed two chemical vehicles in 1932. Based on imported three-axle truck chassis, the D-18 and D-39 had armoured bodies and carried the appropriate spraying and smoke-generation equipment, as well as two 1,100l tanks and one 800l tank respectively. Shortly after delivering the vehicles

for testing, Dyrenkov's design bureau was shut down and work in this area was later transferred to the Compressor factory. They in turn produced two vehicles that were similar to Dyrenkov's: the BKhM-1000 and BKhM-800. Like the D-18 and D-39, they were not accepted for production.

One chemical warfare vehicle that was produced in quantity – almost 100 – was the KS-18, also known as the BKhM-1 (KS-18 may be a reference to the spray equipment produced at the Compressor plant). The KS-18 had a crew of two and was equipped with a 1,000l tank and spraying equipment that allowed it to perform the three main functions of earlier designs. Ninety-four were produced between 1937 and 1939. They served alongside flamethrower tanks in the chemical companies organic to tank brigades, with a theoretical strength of four KS-18s. They were likely also assigned to the chemical armoured car battalions subordinate to the Chemical Protection Directorate. Given the small number of KS-18s produced and the fact that the chemical troops were generally understaffed, few units likely had even a fraction of their normal complement.

## ARMOURED CARS IN ACTION

Beyond their role in the OGPU's internal security operations, Soviet armoured cars were active in a number of conventional conflicts.

### Spanish Civil War

The outbreak of the Spanish Civil War in July 1936 provided the first post-Russian Civil War test of Soviet armoured cars in battle. Germany intervened almost immediately in support of the Spanish Army coup that challenged the left-wing government, playing a key role in facilitating the movement of its most capable elements from Africa to Spain. Both Germany and Italy would provide material support and, in the case of Germany, substantial operational support as well. The ground forces that remained loyal to the government – that would become the People's Republican Army – were poorly led and trained. Military aid and advisors from the Soviet Union soon followed. This aid included three BA-3 and 37 BA-6 heavy armoured cars, as well as 20 FAI light armoured cars.

E

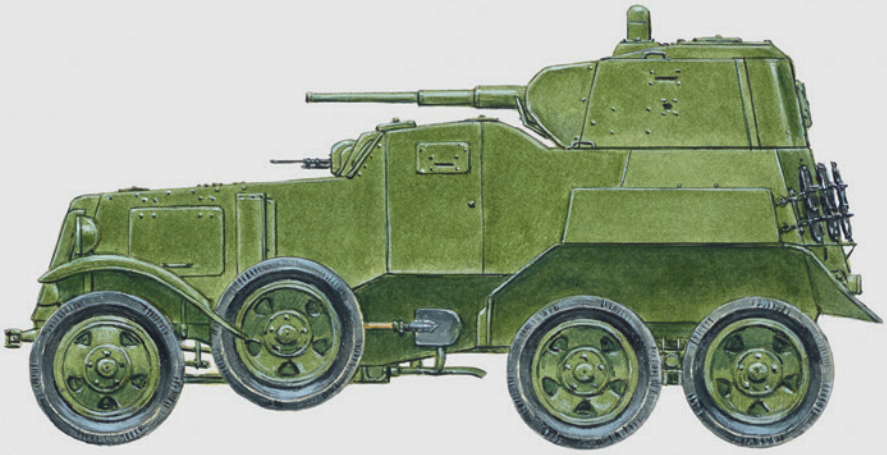
**The BA-10M, BA-11 and KS-18**

**1.** The BA-10M. The most obvious external recognition features are the external fuel tanks on the rear mudguards. Underneath each armoured cover are two separate fuel tanks, as numerous photographs attest. Some BA-10s have both the two fuel tank covers on the hull roof of the original model and the external fuel tanks, indicating they were early-model hulls finished as BA-10Ms or early vehicles retrofitted later. The BA-10M also received an armoured mantlet for its hull machine gun.

**2.** The BA-11 was the Soviets' most modern heavy armoured car. Door and hatch hinges were mounted internally, protecting them from enemy fire and giving the vehicle a very clean appearance. In addition, the openings had an armoured ledge that prevented bullet splash and other debris from entering the interior of the vehicle. While other armoured cars had rail or whip antennas, the BA-11's rod antenna had a mount that enabled it to be rotated forward into horizontal position and out of the way, preventing it from interfering with the turret. As can be seen in the rear profile, the hull armour was sloped at 25 degrees from the vertical, increasing the effective armour protection.

**3.** The KS-18 chemical warfare armoured car was equipped with a single 7.62mm DT machine gun for self-defence. Given the nature of operations it was intended to undertake, it was equipped with a 71-TK-3 radio and handrail-style antenna.

1



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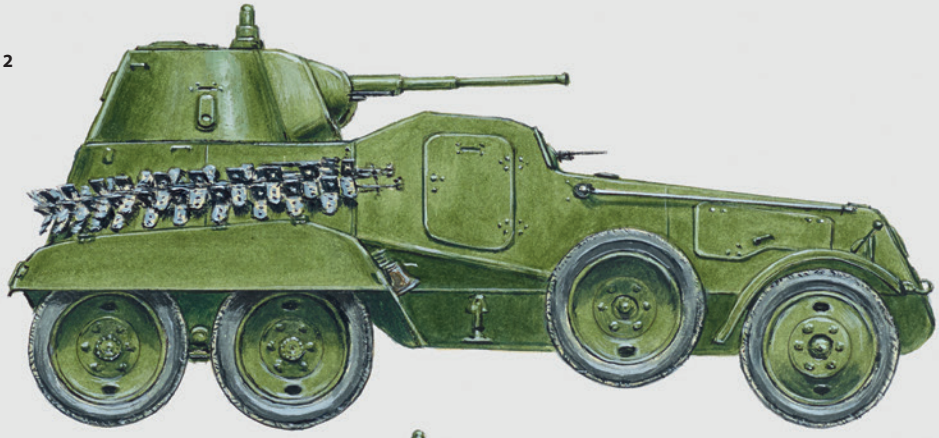

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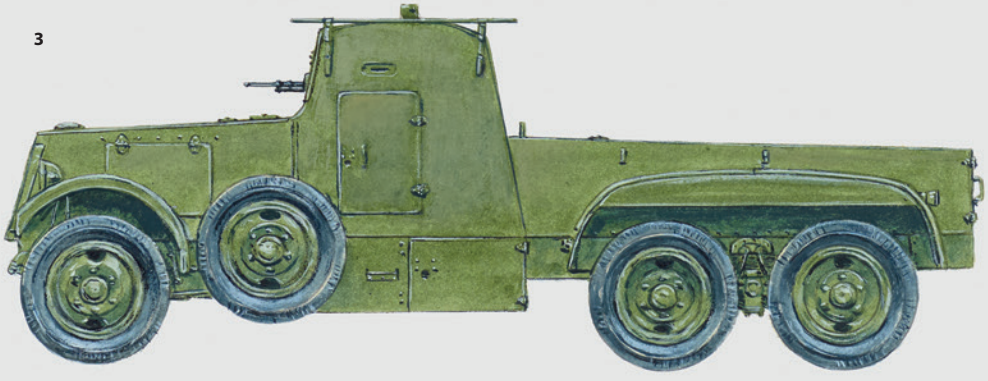

The relatively well-developed road network allowed the armoured cars to demonstrate their potential for rapid movement and tactical surprise, as had previously been shown in the conflicts of the 1920s. This was demonstrated in a counterattack near Valdemaro in November, when six BA-6 and three FAI armoured cars were able to quickly move to respond to a Nationalist breakthrough, destroying 16 CV3 tankettes and forcing others to retreat. A few days later, other counterattacks by 15 T-26s and 12 BA-6s near Madrid resulted in the destruction of more than five CV3 tankettes and numerous artillery and anti-tank batteries.

With the Nationalists having failed to take Madrid, the opposing forces settled into a period of relative stalemate until July 1937, when the Republicans attempted to relieve pressure on the capital through an enveloping attack near Brunete to the west of Madrid. A tank brigade, established the previous December, received its complement of equipment, including 129 T-26 tanks and 43 BA-3/6 and FAI armoured cars. The offensive called for two armoured battalions with 70 tanks and 20 armoured cars to support the main thrust, with an additional battalion of 30 tanks and ten armoured cars supporting an attack in the south-east. The initial attacks made headway, but the offensive ground to a halt as the Nationalists brought up additional forces. A Nationalist counterattack also made initial progress, regaining some lost territory before halting. Although little had changed on the ground, the Republicans suffered heavily, incurring greater casualties than the Nationalists – particularly among their most experienced infantry – and losing about half their armour. More importantly, they permanently lost the strategic initiative. The Republicans were unable to replace their armoured vehicle losses and the number of armoured cars continued to decline. By the end of 1938, there were only seven BA-6 armoured cars left, and even fewer by the end of the war a few months later.

Given the amateurish quality of the Republican Army, it is not surprising that their employment of armour failed to provide any significant tactical or operational lessons of value. It did, however, provide Soviet advisors with useful technical insights into the performance of the armoured cars. They highly praised the FAI for its speed, agility, reliability and small size that made it ideal for reconnaissance. Assessments of the BA-6 were mixed. The power and reliability of the engine came in for criticism, as did the strength of the gears in the demultiplier, used to supplement the regular transmission when operating in difficult driving conditions. Noted as positives were the quality of its tyres and the capability of the 45mm cannon. While the thin armour of the light tanks and tankettes the BA-6 faced would have offered little protection against any dedicated anti-armour weapon, the penetration provided by the 45mm cannon would allow the BA-6 to effectively engage tanks through the beginning of the German invasion of Soviet Union. The thin armour of both armoured cars was noted as a weakness, but the range of the 45mm cannon allowed the BA-6 to avoid closing with the enemy.

### Khalkhin Gol

The background to the Khalkhin Gol campaign in Mongolia and the initial combat use of armoured cars is described in the commentary to Plate F. Skirmishing continued through June 1939, including a Soviet attack consisting of an infantry battalion supported by an armoured car company and artillery. The target was a built-up area housing a Japanese infantry

The BA-6 was the most numerous armoured car type sent by the Soviet Union to bolster the Republican forces in Spain. The BA-6s here were knocked out in the Ebro battles of 1938. (S. Zaloga collection)

battalion, a regiment of Manchukuo cavalry, a battery of 75mm guns and a battery of 37mm anti-tank guns. Japanese fire soon pinned down the Soviet infantry, but the arrival of the armoured cars disrupted the Japanese defence and allowed the Soviet infantry battalion to disengage. This came at the cost of one BA-3 and two BA-10s lost to enemy fire and another five BA-10s damaged. One BA-3 became stuck and had to be abandoned.

In early July, the Japanese launched their assault. Three infantry regiments and a battalion from a fourth crossed the Khalkhin Gol River on the night of 2/3 July and advanced south on the western side of the river. The attack made good progress as the bulk of Soviet forces were located over 100km away. The Soviet 11th Tank Brigade and 7th Motorized Armour Brigade were fed into action as they arrived without preparation. Both units suffered badly, with the 7th losing 20 of its 50 armoured cars; another ten were damaged. Despite the losses, the arrival of the Soviet armour checked the Japanese advance and the Japanese withdrew back across the Khalkhin Gol on 5 July.

On the eastern side of the river, two Japanese tank regiments equipped with 73 tanks – roughly evenly comprised of Type 98s and Type 95s – and a regiment of infantry also advanced south. On the night of 2/3 July, the Japanese struck the 9th Motorized Armour Brigade, the right flank of which was held by 35 BA-6 and BA-10 armoured cars. Three infantry assaults were repulsed, but some of the Japanese infantry were able to approach close enough to destroy three armoured cars with Molotov cocktails. The following day, the Japanese armour appeared and engaged a group of 12 BA-10s. The BA-10s took up hull-down positions and destroyed nine Japanese tanks at the cost of six armoured cars damaged. The next day, the Japanese launched an attack against the 149th Infantry Regiment, reinforced by elements of the 9th Motorized Armour Brigade, that resulted in the loss of another ten tanks, four of them to armoured cars. By 9 July, the Japanese thrust on the eastern side of the river had also run out of momentum and was forced to withdraw with the loss of half its tanks. Inconclusive fighting continued through the rest of the month and the first half of August.

Armoured cars played an important role in the Soviet counteroffensive that began on 20 July. The 8th and 9th Motorized Armour Brigades were assigned to the right and left flanks respectively of the double envelopment that would encircle and destroy the Japanese forces on the eastern side of the Khalkhin Gol. Once in the enemy rear areas, they were able to surprise the Japanese forces there, destroy large quantities

of supplies and pursue enemy forces attempting to retreat. The success of the Soviet plan effectively ended the campaign, and a ceasefire came into effect on 15 September.

Fifty-two BA-3/6, 41 BA-10, 17 FAI and 14 BA-20 armoured cars were lost in the campaign. Despite the losses, the armoured cars received praise for their performance. The 45mm cannon of the heavy armoured cars was more than sufficient for defeating the armour of the Japanese tanks. The speed and mobility of the armoured cars were instrumental in responding to the initial Japanese offensive and the execution of the Soviet counteroffensive. Their armour was proof against shell fragments and small-arms fire, and the GK tyres proved resilient even to 37mm anti-tank gun hits. The armoured cars also proved to be extremely versatile, performing a wide range of tasks including reconnaissance, supporting infantry attacks, attacking isolated groups of the enemy, liaison and communication, convoy security, delivery of supplies to units under indirect fire and serving as transport for unit commanders. The most significant criticism of the BA-6 and BA-10 was the location of the internal fuel tanks above the driver and hull machine gunner, which when hit had catastrophic results for the vehicle and crew.

F

**Khalkhin Gol, clash of cavalry, 20 May 1939**

With the 1932 Japanese establishment of the puppet state of Manchukuo in Manchuria and a disagreement over the boundary between it and the Soviet-allied Mongolian People's Republic, hostilities between Japan and Russia were likely inevitable. A mutual assistance agreement was signed between Mongolia and the Soviet Union in 1936. That same year, Soviet troops from the 57th Special Corps in the Transbaikal Military District entered Mongolia to bolster Mongolia's small army. The LVII Special Corps had an estimated 370 heavy and 167 light armoured cars, consisting of the BA-10, BA-6 and BA-3 heavy, and FAI and BA-20 light armoured cars. Unique to the LVII were three motorized armoured brigades (7th, 8th and 9th) equipped with armoured cars rather than tanks. Most of the corps' armoured cars were assigned to these units. The armoured cars outnumbered the available tanks and constituted about a third of the cannon-armed vehicles.

The ill-defined border separating the Russians and Japanese in China had already resulted in hundreds of exchanges of gunfire and a battle in 1938. In 1939, hostilities resumed in what would become known as the battles of Khalkhin Gol, named after the river which Japan claimed was the boundary between Manchukuo and Mongolia. On 11 May, a skirmish broke out between Mongolian and Manchukuo cavalry units, quickly escalating as both sides committed additional troops.

This scene depicts the attack of 35 BA-6 and BA-10 armoured cars on a Manchukuo cavalry unit, which crossed the Mongolian/Soviet recognized border about 10 miles east of the river. The armoured cars quickly outpaced the infantry battalion with which it had begun the attack and independently drove back the cavalry with heavy casualties, including to the cavalry regiment headquarters. However, the armoured cars attacked without mounting their auxiliary tracks and four BA-6s became stuck in the sandy soil that predominated on the eastern side of the river, being destroyed by enemy fire.

Sporadic fighting continued through June. In July, the Japanese launched an offensive that, after making initial gains, ground to a halt. The Soviets launched a counter-offensive the following month that drove the Japanese back to the border. A ceasefire on 15 September effectively ended the campaign.

Armoured cars demonstrated a high degree of operational mobility in the campaign, which proved invaluable in defeating the Japanese and provided the Soviets with important experience in handling mechanized forces. The 11 May action underscored the need to use the auxiliary tracks in marginal terrain, which later enabled vehicles to avoid becoming immobilized and easy targets for enemy fire. The campaign also proved the effectiveness of the GK bullet-resistant tyres. It also highlighted a shortcoming in the design of the BA-3, BA-6 and BA-10. The vehicles had gravity-fed fuel tanks inside the crew compartment, mounted to the roof and just behind the driver and front machine gunner. When hit, the consequences were devastating. This design flaw would be rectified in the design of the BA-10M, which had fuel tanks mounted externally on the rear fenders under armoured covers.

## Poland

Two days after the end of the Khalkhin Gol campaign, Soviet armoured cars went into action again, this time as part of the invasion of Poland. The Soviet Union committed about twice as many armoured vehicles to the campaign as did Germany, including 380 armoured cars. They were assigned primarily to the two tank corps and 11 separate tank brigades.

By the time of the Soviet invasion, the military situation was already dire for the Poles, the Soviets' entry into the conflict ending the prospect of any large-scale organized resistance. Although the Poles could do little but withdraw in the face of the massive Soviet force, there were a number of small actions as the defenders conducted their delaying operation.

A confused action near Lwów on 19 September led to the Germans, Poles and Soviets becoming embroiled. Having mistaken the Soviets for defending Poles, the Germans opened fire, to which the Poles added their own fire. The Soviets returned the German fire, resulting in casualties on both sides, with two BA-10s and a tank being destroyed on the Soviet side. The same day, three BA-10s from the 36th Tank Brigade repulsed a Polish attack near Werba before losing one BA-10 to a mine the following day. In all, ten BA-10s were lost in the short campaign.

## The Winter War

The Soviet Union began the Winter War in November 1939 following Finland's refusal to grant it territorial concessions. The environment was much different from Manchuria and Poland, with the swampy, heavily wooded terrain, numerous lakes and limited road network severely constraining operations, especially for the armoured cars. They were mainly used for convoy escort, patrolling roads and headquarters security. Largely confined to the few roads, the armoured cars and other wheeled vehicles were relatively easy prey for the ambush and encirclement tactics of the more mobile Finns, as well as to mines.

The conflict saw a wide range of armoured car types committed to action, from a few elderly D-8s and BA-27Ms to the more modern BA-10. Many of the armoured cars served in the reconnaissance battalions organic to the infantry divisions that constituted the bulk of the invasion force; the battalions typically each had ten or 11 heavy armoured cars, generally BA-10s but sometimes supplemented with BA-3s or rarely D-8s. The heaviest armoured car losses occurred in the 8th Army, positioned to the north of Lake Lodoga, and the 9th Army, to the north of the 8th and opposite central Finland.

The 8th Army had 81 armoured cars in the reconnaissance battalion of its infantry divisions, with roughly equal numbers of BA-10s and BA-20s, and two FAIs. In addition, there were 25 BA-20s assigned to the 9th Army's tank brigade.

The Soviet Union committed large forces to the invasion of Poland in mid-September 1939, including almost 400 armoured cars, among which was this BA-20M. (S. Zaloga collection)

Finnish soldiers examine a radio-equipped BA-20. This photo clearly illustrates the nature of the terrain faced by the Soviets in the winter of 1939, which kept them largely confined to the limited road network. Behind is a Komsomolets armoured tractor. (SA-kuva)

Although initially forced to fall back in the face of the 8th Army's advance, the Finns succeeded in encircling and destroying two divisions and the tank brigade, capturing 43 armoured cars.

The 9th Army suffered a similar fate. Only one of the three divisions had their normal complement of armoured cars and the other two about half the usual number, one being equipped with two BA-27Ms and three D-8s. The Finns decimated two of the 9th Army's divisions, and of the Army's 20 armoured cars, seven were lost to various causes, with two BA-27Ms, two BA-3Ms, two BA-6s, three D-8s and one BA-20 abandoned.

## World War II

At the beginning of World War II there were about 3,350 heavy and 1,900 light armoured cars in the Soviet inventory. The principal armoured car types were the BA-10 and BA-20, but there were still a number of older models in service. Small numbers of BA-3s and BA-6s could be found in the reconnaissance elements of infantry units. For example, one year into the campaign one motorized rifle brigade still had one BA-3 and BA-6 serving alongside its 18 BA-10Ms, and BA-3s still provided headquarters security for the 19th Army as late as 1945.

A BA-3 and BA-10M captured and pressed into service in 1941. These vehicles were part of the 7th Armoured Car Platoon assigned to the VII Army Corps, one of two separate armoured car platoons equipped with ex-Soviet heavy armoured cars. The single captured BA-3 was designated BAF A by the Finns, while the more common BA-10/-10M was known as the BAF C. (SA-kuva)

Many of the armoured cars in the western districts of the Soviet Union were lost in combat or abandoned to the enemy in the early months of the German invasion in 1941. For example, in the first seven weeks of the invasion, the 13th Tank Division lost 74 of its 78 armoured cars. Sixty – mostly BA-10s and

An FAI – BAB A in Finnish service – was assigned to the 5th Armoured Car Platoon, the third of the three platoons with captured Soviet armoured cars to fight in the 1941 Continuation War. They were used primarily in liaison and communication roles. (SA-kuva)

BAI-Ms, but also including BA-3s, BA-6s and BA-20s – were combat losses and the remainder to mechanical reasons. Most of the BA-10s were located in the west, and some 80 per cent were lost during this period. While most of the losses can be attributed to the speed of the German advance, misuse of armoured cars in roles normally assigned to tanks – such as supporting infantry attacks – or in attacks unsupported by other arms also resulted in disproportionate losses.

**G**

**First day of Operation *Barbarossa*, 22 June 1941**

Armoured cars were some of the first Soviet armoured vehicles to see action. Two hours after the start of the German invasion, six BA-10s were ordered forward by the 5th Armoured Division/III Mechanized Corps. Outside a town, the armoured cars took up camouflaged ambush positions in a wood on both sides of the road and awaited the advancing Germans. The lead elements of the German 7th Panzer Division/XXXIX Armeekorps (mot.) in the form of two motorcycle platoons – probably from the 37th Reconnaissance Battalion – came under fire from the BA-10s at about 1000hrs and suffered heavy casualties. After an hour, three tanks approached and all were knocked out. Shortly after, three German tank platoons and additional motorcycle infantry came forward. These were driven off by the BA-10s, suffering three tanks damaged and heavy losses to the infantry. When the main body of the 7th Panzer Division approached, the armoured cars withdrew.

The 7th Panzer Division drove forward and managed to establish bridgeheads across the Neman River at Alytus. There the main body of the 5th Tank Division was able to launch a series of counterattacks that halted the German advance. However, this came at the cost of just over a quarter of the division's tanks, and it was compelled to withdraw. The 7th Panzer Division met little opposition as it continued its eastward push, ultimately helping to isolate Minsk just a few days later.

The BA-10s' delaying action portrayed in this scene highlights the effectiveness of the 45mm cannon that had become the standard armament of Soviet heavy armoured cars. It easily outmatched the protection of German tanks in the early phase of the German invasion and enabled the heavy armoured cars – when skilfully handled – to effectively combat German armour. The first year of Operation *Barbarossa*, however, was a difficult one, particularly for the armoured cars. Their inherent mobility was insufficient to compensate for the speed of the German offensive, and many of them would be lost. A significant number were captured and repurposed by the Germans in less demanding roles.

Two BA-10s photographed during the early weeks of Operation *Barbarossa*. (Nik Cornish at www.Stavka.org.uk)

These losses led to a refocusing of armoured cars on reconnaissance, security and liaison roles more appropriate to their capabilities. In large measure, this was the result of the fielding of the BA-64 as the principal armoured car type, its light armament precluding it from a major combat role. It frequently served as staff and liaison vehicle, as well as for resupplying forward positions. Vasiliy Krysov, who served as a T-34 tank and SU-85 tank destroyer commander, recalled several instances of armoured cars being used in the staff role and even taking part in attacks alongside the SU-85s.

The history of the 1st Independent Armoured Car Battalion subordinate to the Leningrad Front serves as an excellent illustration of the kinds of missions undertaken. Formed in January 1942, the battalion spent the year serving as a mobile reserve and bolstering the defence of rifle units.

During February–March 1943, the battalion – consisting of three companies of seven BA-10s each and a single headquarters armoured car – took part in a number of actions. On 4 February, it supported the 63rd Guards Rifle Division in seizing the village of Krasny Bor. It then conducted reconnaissance operations, and on the 11th supported the advance of two infantry regiments and repelled a German counterattack. At the cost of five BA-10s destroyed and two damaged, the attack destroyed nine guns and killed approximately 150 enemy personnel. After receiving six BA-10s as replacements, the battalion was ordered to take the town of Sablino. The attack failed and three of the armoured cars were immobilized. The unit spent the rest of the year performing communications and security duties.

A BA-10 destroyed during the early weeks of Operation *Barbarossa*. (Nik Cornish at www.Stavka.org.uk)

In January 1944, one of the battalion's companies supported the capture of the town of Novo-Lisino by the 56th Infantry Division and conducted a follow-on attack that seized the villiage of Logi, holding it for several hours until relived by the infantry. The battalion's remaining two companies conducted an

A group of BA-10s pause at Viipuri, Finland in March of 1940. The nearest vehicle is fitted with auxiliary tracks. They appear to be escorting a column of other vehicles, a role to which they were well suited. (J. Ledwoch)

attack near Zaitsevo, but were driven back. One German tank was destroyed and nine anti-tank guns captured for the loss of three armoured cars knocked out and one damaged.

After conducting reconnaissance operations in the intervening interval, April 1944 saw the resumption of combat. Overcoming strong resistance, the battalion seized and held the villages of Yavanovo and Pavlovo until infantry was able to arrive. An attempt to continue the attack ran into heavy fire and numerous armoured cars were destroyed. With only three BA-10s remaining in the battalion, the unit was withdrawn and saw no further combat.

In the comparatively quiet regions of central Asia and the Far East, relatively small numbers of older armoured car types – including FAI,

The commander of a BA-10M belonging to the 1st Guards Armoured Brigade confers with a T-34 commander in 1942. Armoured cars served a vital reconnaissance role, providing information to the primary combat elements. (J. Ledwoch)

BA-27M, BAI-M, BA-3 and BA-6 – still served. None of these apparently took part in the Soviet offensive against Japan in 1945, only 19 BA-10s and 17 BA-20s being recorded as participating in these final actions.

## EPILOGUE AND POST-WAR

The BA-64 series remained in active Soviet service until 1953. It also served in the armies of the Soviet's client states in Eastern Europe, China and Albania, and saw action again against United Nations forces in the Korean War.

The armoured car as a vehicle optimized for the reconnaissance role fell into relative disfavour after the end of the war. Its role was overshadowed by the need to develop and field new weapons and to redress some of the shortcomings of the Soviet military that had been only partially offset during the war by lend-lease deliveries from the US and the United Kingdom. Among the armoured vehicles provided under that programme was the M3A1 Scout Car, a 4x4 reconnaissance vehicle that was also pressed into service as a command vehicle. Having been replaced in US service by the M8 and M20 armoured cars in the reconnaissance and utility roles respectively, some 3,340 M3A1s were shipped to the Soviet Union during the war, with 228 being lost en-route. They performed a similar role in Soviet service, and photographs from 1944 and later showed that they often operated in conjunction with the BA-64s. They also served as armoured personnel carriers, despite their limited seating capacity. Along with the M3A1 Scout Car, the Soviets also received just over 1,000 M2, M3, M5 and M9 halftracks. Despite the lend-lease deliveries, the lack of a suitable armoured infantry transport remained a problem for the Soviets as the war entered its final and more mobile stage.

The first post-war armoured car design was intended to fill this and other voids. Design of the BTR-40 began in 1947. The final version was similar in appearance to the M3A1 Scout Car and shared the same disadvantages of an open top (this would be rectified in the BTR-40B), no amphibious capability and limited personnel-carrying capacity. In addition to the armoured personnel carrier, there was a fire support version armed with twin 14.5mm machine guns. In practice, it served in a variety of utility roles and was the basis for a number of specialized variants. It left much to be desired as a reconnaissance vehicle and was further handicapped by the lack of a central tyre pressure system, which would have improved its cross-country performance. A subsequent attempt to fit one revealed that the add-on system was excessively vulnerable to damage and the effort did not progress beyond the testing stage.

Development of the first specialized reconnaissance armoured car began in 1954 and it entered service three years later. Its role was reflected in its designation, BRDM, which translates to Armoured Reconnaissance-Patrol Machine. Although based on the BTR-40 chassis, the standard production model that entered service in 1958 corrected virtually all of its shortcomings. It had an armoured roof (the earliest 1957 production models retained an open top), a central tyre pressure system and was amphibious. A trim vane at the front and the vehicle's boat-shaped hull facilitated its transit in water, being propelled by a four-bladed propeller

**ABOVE LEFT**
A nicely restored BA-64B at the Vadim Zadorozhniy Technical Museum outside of Moscow. (S. Zaloga collection)

**ABOVE RIGHT**
An overhead view of the BA-64B while on display at the Ordnance Museum at Aberdeen Proving Ground. This particular vehicle was captured by the US Army in Korea in 1950. (S. Zaloga collection)

that drew in water from the bottom of the hull. Perhaps the most distinctive feature was the presence of four chain-driven aircraft-type auxiliary wheels. These were fitted into the bottom of the hull between the vehicle's two axles and could be lowered to help the vehicle from bottoming out on uneven terrain. Its armament was somewhat limited, with a single 7.62mm machine gun on an external mount. It served as the basis for command, NBC reconnaissance and anti-tank guided missile launcher variants, the latter with a retractable launcher for 3M6 Shmel, 3M11 Fleyta and 9M14 Malyutka missiles.

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